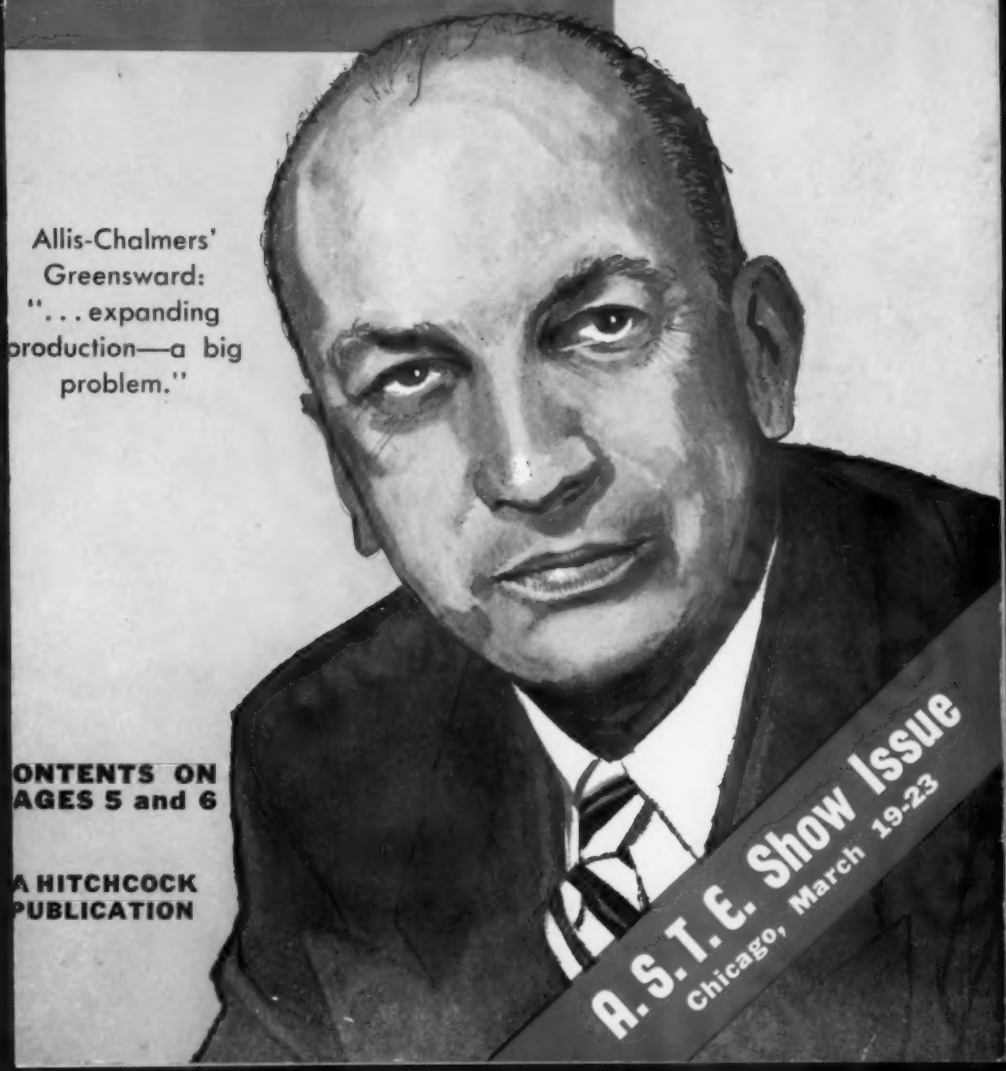
Machine and Tool BLUE BOOK

MARCH 1956

1906 50 ANNIVERSARY 1956



Allis-Chalmers' Greensward: "... expanding production—a big problem."

CONTENTS ON PAGES 5 and 6

A HITCHCOCK PUBLICATION

A.S.T.E. Show Issue
Chicago, March 19-23

Efficiency in Cutting-off is Important

Practically all machining operations start with pieces cut-off from bars or billets. Hence, inefficiency, or lack of capacity, in the cut-off department can hold up or stagnate the entire plant.

A. Are all-ball-bearing and provide a quick return; therefore they run FASTER than others on the same work.

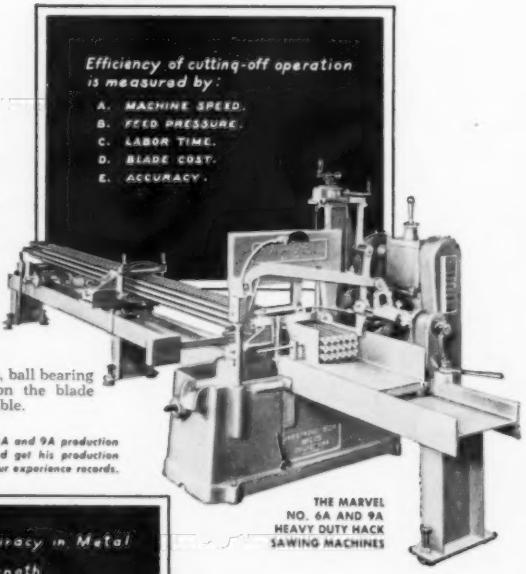
B. Can apply as much as 1200 pounds feed pressure—two to ten times as much as other hack saws and band saws.

C. Are fully automatic, requiring no more operator attention than an automatic screw machine; and set-up for any bar size and cut-off length is extremely simple.

D. Use a non-breakable high speed hack-saw blade — the type of saw blade that produces the greatest number of square inches of metal cut per dollar of blade cost—two to ten times (or more) as much as any band saw.

E. Because of their exceptional sturdiness, ball bearing reciprocating frame, ability to tension the blade "truly taut", their accuracy is dependable.

If you are not using modern, improved MARVEL NO. 6A and 9A production hack saws, call the local MARVEL Field Engineer and get his production and cost estimates on your work—to compare with your experience records.



THE MARVEL NO. 6A AND 9A HEAVY DUTY HACK SAWING MACHINES

Formula for Accuracy in Metal Sawing:

$$\text{ACCURACY} = \begin{cases} \text{Length} \\ \text{Straightness} \\ \text{Squareness} \end{cases}$$

$$\begin{matrix} \text{Straightness} \\ \text{Squareness} \end{matrix} = \begin{cases} \text{Blade Rigidity} \\ \text{Blade Tautness} \end{cases}$$



The composite MARVEL High-Speed-Edge Hack Saw Blade—cuts **any** machinable material efficiently. There is no time lost changing blades for different types of steel; no time lost replacing shattered blades, because MARVEL High-Speed-Edge Hack Saw Blades are positively **unbreakable.** These superior blades have the finest high speed steel cutting edge welded to a strong alloy steel body. They will stand-up under the highest speeds and heaviest feeds attainable on any make hack saw. Can be safely tensioned tauter than any other blade—cut-off not only straight but also square and with less stock loss.

Write for catalog C-55—showing and describing eleven different series of Metal-Cutting Sawing Machines and MARVEL-High-Speed-Edge Hack Saw Blades and Hole Saws.

MARVEL Metal Cutting SAWS
Better Machines—Better Blades

ARMSTRONG-BLUM MFG. CO. 5700 West Bloomingdale Avenue • Chicago 39, U.S.A.

WHEREVER

YOU NEED

ACCURATE

HOLES



PARTS PRODUCTION

Fast sizing and finishing in one operation. Makes holes geometrically perfect—accurate to .0001". Finish to 2 micro-inches RMS in hardened steel.

PRODUCTION SALVAGE

Low cost sizing of parts partially completed in mass production. Correct reject parts: taper, out-of-round, improper finish.

YOU NEED SUNNEN HONING

GENERAL MACHINE SHOP

Many uses: sizing or fitting all kinds of parts—in any hardness. Making special parts. Hold tolerances of .000025" in tool and die work, if needed.

MAINTENANCE DEPT.

Fast sizing of repair parts, fitting matched parts or bearings . . . reconditioning worn, hard-to-replace parts.

DIA. RANGE ½" to 2½"

STOCK REMOVAL—GEOMETRIC ACCURACY
PRECISION SIZING—FINISHING

clip and mail coupon now

SEE SUNNEN HONING MACHINES IN OPERATION
BOOTH 474—MARCH 19-23
A. S. T. E. SHOW—CHICAGO

6782

SUNNEN®
PRODUCTS COMPANY
7930 MANCHESTER AVE. • ST. LOUIS 17, MO.

SEND FREE HONING PORTFOLIO
(CASE HISTORIES AND TECHNICAL INFORMATION)

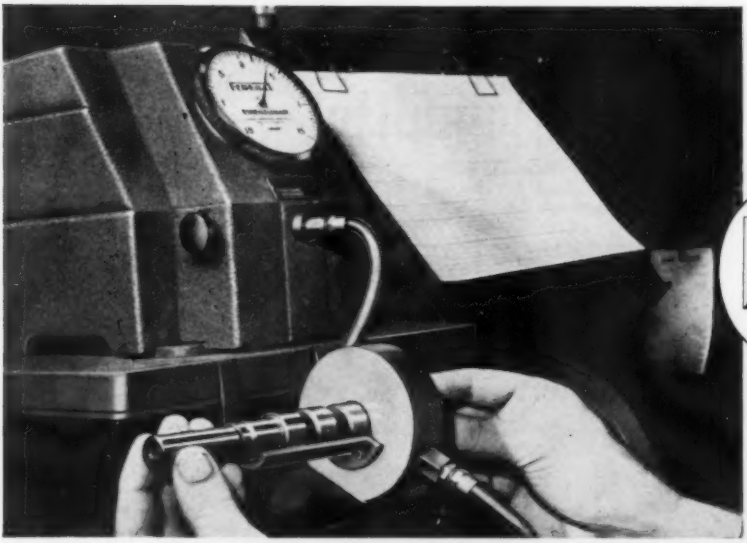
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COMPANY_____

ADDRESS_____

CITY _____ ZONE____ STATE____

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Find out for yourself the facts about Dimensional Air Gages...it's easy!

There's a lot of confusing talk today about the merits of various air gages. It's difficult to learn the true facts. Each manufacturer of air gages naturally claims his is superior. So how are you going to determine which, in the long run, is the best for you to buy?

Find out the facts for yourself. You don't have to accept any gage manufacturer's claims. We invite you to let us put a Dimensionair right in your own shop so that all personnel involved can operate and compare it with any other air gage on the market.

Forget all about sales pitches and competitive arguments. *You* make the decision yourself. After comparing the Dimensionair with the air gages now in your plant, or directly in competition with any other air gages, make your decision entirely on the basis of your own actual tests and comparisons. *You* be the judge!

Ask **FEDERAL** *First*

FOR RECOMMENDATIONS IN MODERN GAGES . . .

Dial Indicating, Air, Electric, or Electronic — for Inspecting, Measuring, Sorting, or Automation Gaging

Find out which is the best air gage for your plant. Send us this coupon:

Federal Products Corporation
6253 Eddy Street • Providence 1, R. I.

We'd like to test a Dimensionair in our plant.

Company Name

Your Name *Title*

Address

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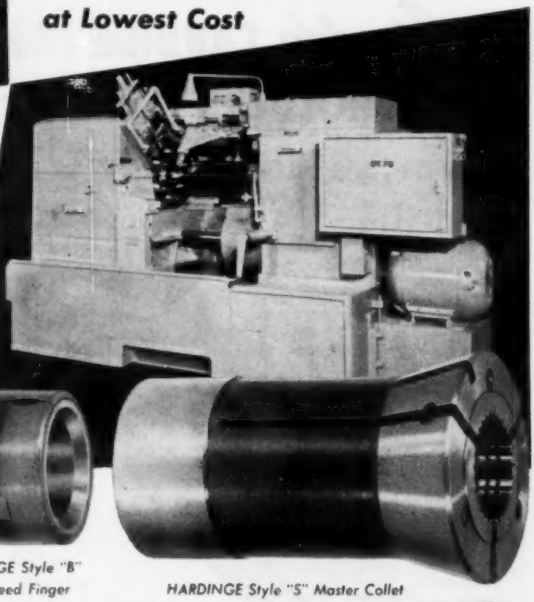
HARDINGE COLLETS and FEED FINGERS
for NEW BRITAIN Automatics*

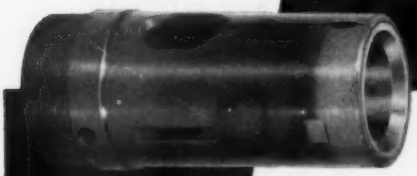
HARDINGE
ELMIRA, N.Y.

Assure Maximum Production at Lowest Cost

Reduce tooling costs and step up production on your New Britain Automatics with HARDINGE customer shop-proved collets and feed fingers.

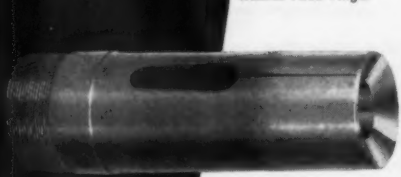
* *Also available for the following automatics: Cone, Greenlee, Gridley and Acme-Gridley, National Acme.*



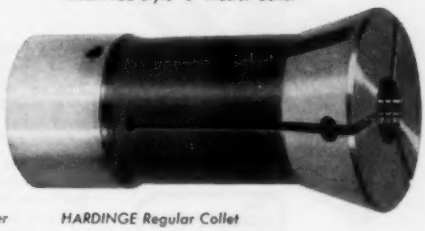


HARDINGE Style "B" Master Feed Finger

HARDINGE Style "S" Master Collet



HARDINGE Regular Feed Finger



HARDINGE Regular Collet

Immediate



Stock Delivery

from Hartford
New York Philadelphia
Dayton Chicago
Minneapolis St. Louis
Detroit San Francisco
Los Angeles Elmira

Choose for your requirements:

Hardinge Master Collets and Feed Fingers . . .
The only master collet with no work pressure on the screw.
Pads are completely interchangeable among machines of similar capacity.

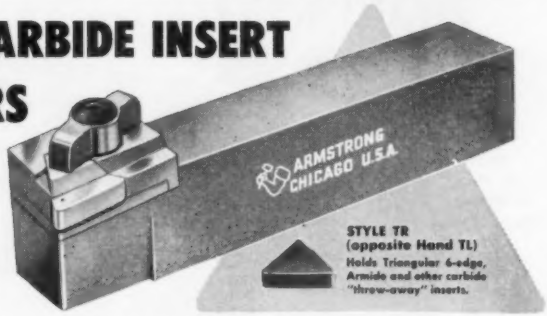
Hardinge Regular Collets and Feed Fingers . . .
Precision made, hardened and ground internally and externally.

One source of supply for all collets and feed fingers.

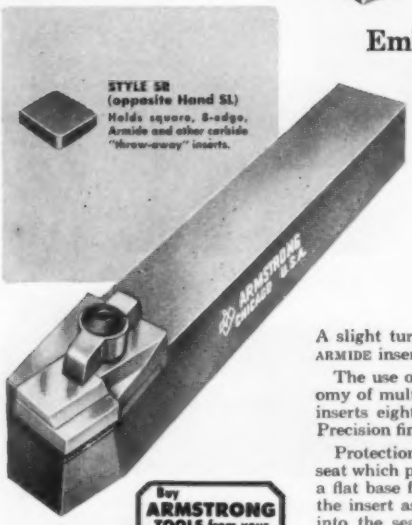
HARDINGE BROTHERS, INC., ELMIRA, N. Y.

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New ARMSTRONG *Armide* CARBIDE INSERT TOOL HOLDERS



STYLE TR
(opposite Hand TL)
Holds Triangular 6-edge, Armide and other carbide "throw-away" inserts.



STYLE SR
(opposite Hand SL)
Holds square, 8-edge, Armide and other carbide "throw-away" inserts.

Embody...Convenience, Economy Simplicity and Strength based on these superior features:

- **IMPROVED CLAMPING METHOD — speeds indexing of Inserts.**
- **REPLACEABLE SEAT of Hardened Tool Steel — protects shank and provides flat base to prevent damage to inserts as they are clamped in position.**
- **SHANK of Heat Treated Alloy Steel — gives extra strength and rigidity.**

A slight turn of a single screw permits rapid indexing of the ARMIDE insert — reducing down time to a minimum.

The use of ARMIDE "throw away" inserts provides the economy of multiedged inserts — triangular inserts have six, square inserts eight cutting edges. These are available in Utility or Precision finish and in three grades of ARMIDE: 350, 370 or 883.

Protection to the shank is given by the replaceable tool steel seat which prevents wear and damage to the shank and provides a flat base for the insert reducing the possibility of damage to the insert as it is clamped in place. A relief groove is ground into the seat providing clearance when a dulled insert with "built up" edges is turned over.

ARMSTRONG ARMIDE Carbide Insert Tool Holders are furnished in two styles and three sizes. Complete data on these tools is given in Bulletin CIT, mailed on request.

Buy **ARMSTRONG TOOLS** from your Industrial Distributor

Write for catalog

ARMSTRONG BROS. TOOL CO.

"The Tool Holder People"

5208 W. ARMSTRONG AVENUE **CHICAGO 30, ILL.**

See us at Booth No. 1324, A.S.T.E. Show, International Amphitheatre, Chicago, March 19-23

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BPA

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Hitchcock District Managers are Listed on Page 64.

no one has ever paid for service

There's never been a charge . . . never . . . for factory service on a Fulmer Honing Machine! And Fulmer Service is far more than an empty phrase. A company airplane is maintained to deliver service personnel and replacement parts, often in a matter of hours to meet an emergency. Fulmer machines offer the following added advantages:

FASTER . . . EASIER . . . MORE ECONOMICAL PRECISION-HONING OF INTERNAL BORES

. . . for FULMER HONING MACHINES



Amazingly fast . . . stock removals up to 1½ cu. in. per minute . . . geometrically accurate . . . surface finishes down to one micro inch, rms . . . identical finish from hole to hole . . . generous overload capacity, etc.

Fulmer precision honing machines can do for you what they are doing all over the world.—save time and money! Write for Bulletin on Honing to: C. Allen Fulmer Co., Dept. "B" 107 E. 4th St., Cincinnati 2, O.

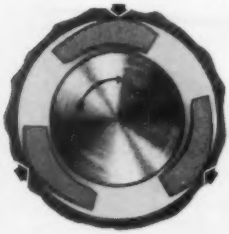
FULMER *honing equipment*

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You're Sure of Precision and Production with NEW



CINCINNATI FILMATIC 6"R x 18" PLAIN HYDRAULIC GRINDING MACHINE
equipped with automatic push-button infeed and electric gage sizing





Automatic Grinding Wheel Balancing and FILMATIC Grinding Wheel Spindle Bearings are standard equipment. (FILMATIC principle illustrated at the left.) These two cost-reducing features alone are reason enough to choose Cincinnati.



High degree of accuracy is easier to obtain than ever before because of the new infeed unit.

CINCINNATI

CINCINNATI

Cincinnati Filmatic
Plain Hydraulic Grinders

Speculation in precision and production has no place in today's metalworking shops. You can quickly end the guesswork where it hurts most . . . in your precision cylindrical work. Just install new CINCINNATI FILMATIC Plain Hydraulic Grinders in your shop and you'll have definite production that you can count on year after year, and within closer limits of accuracy than ever before. ¶Several Cincinnati features that help you attain these highly desirable results are illustrated below. These and many other features, translated into benefits for your shop, are outlined in two attractive catalogs: G-660 for the 6"R and 10"L machines; G-661 for the 10"R and 14"L machines. Write for copies.

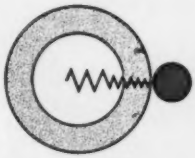
CINCINNATI GRINDERS INCORPORATED
CINCINNATI 9, OHIO

Members of this family group of CINCINNATI FILMATIC Plain Hydraulic Grinding Machines are:

Size	Between-Center Lengths	Catalog
6"R, 10"L	18" and 30"	G-660
10"R, 14"L	18", 36", 48" 72" and 96"	G-661



Automatic electric gage sizing (extra) includes an exclusive Cincinnati advantage . . . automatic compensation for wheel wear and truing.



Gap eliminator . . . greatly reduces time spent in "cutting air" during automatic infeed grinding operations. (extra)

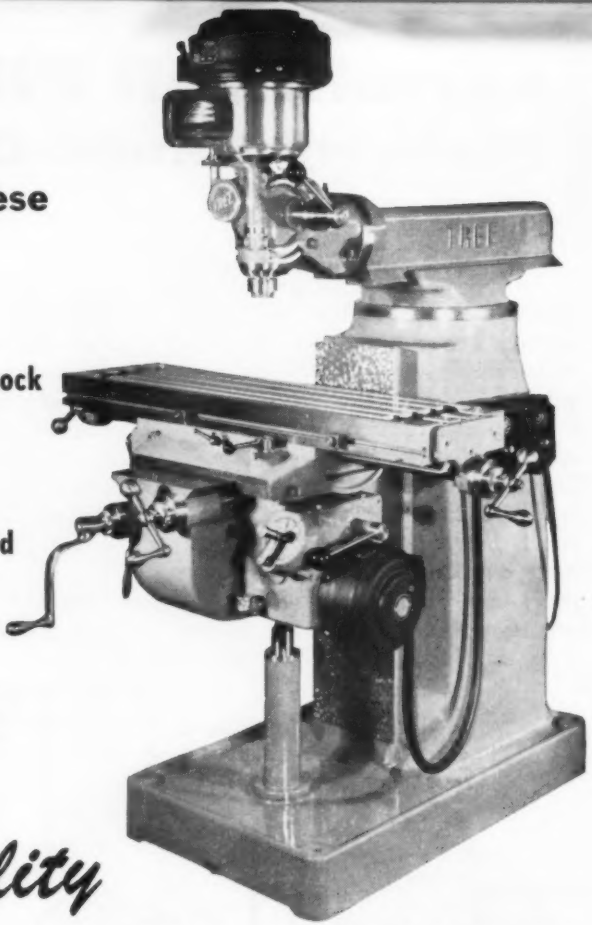
CENTERTYPE GRINDING MACHINES • CENTERLESS GRINDING MACHINES
CENTERLESS LAPPING MACHINES • MICRO-CENTRIC GRINDING MACHINES

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The TREE 2UV MILL

gives you these features–

- Roller Drive
- One Clamp Turret Lock
- Automatic Collet Closer
- Built-In Power Feed
- Rapid Traverse
- Labor Saving Operator Controls



plus Versatility

The TREE 2UV Vertical Mill combines rigidity and flexibility to make it one of the most versatile on the market today. The following features make it adaptable to a wide range of jobs:

- Fully universal milling head with power feed
- Dovetail type ram—360° movable turret
- Table — 10½"x42" — power feed and rapid traverse
- Hardened and ground lead screws by Ex-Cell-O
- Ample range: 25" longitudinal, 11" transverse, 17½" vertical travel
- Weight—2400 lbs.

Write for complete information . . .

See our exhibit in the A.S.T.E. show in Chicago—Booth 605.

TREE TOOL AND DIE WORKS

1600 JUNCTION AVENUE RACINE, WISCONSIN

Manufacturers of—MH-4 UNIVERSAL MILLING HEADS
TB-4 TAPER BORING TOOLS

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little GIANT

The Gray planer Cub has all of the characteristics of its renowned king-size family of production giants: lightning speed-brute power-tremendous rigidity. Heavy carbide planing is effortless. Built for high production with great precision, its Gray exclusive engineering features will prove to you that

Quality doesn't cost . . . it pays.

The G. A. GRAY Co., Cincinnati, Ohio

Sets screws 83% faster

ROTOR RIGHT ANGLE NUTSETTER speeds assembly of radio chassis

JOB: Driving #8 hex head self-tapping screws for assembly of radio chassis.

FORMERLY: Electric Nutsetter, operating at 1750 rpm. Too slow.

NOW: Rotor S-02LRA Right Angle Reversible Air Nutsetter operates at 3200 rpm, gives faster run down, handles easier.

RESULTS: 83% saving in time. Used 60% of production time, "02" Nutsetter paid for itself in about 4 weeks.

This Rotor Nutsetter lasts longer, performs better than other midget right angle tools because of an all-steel right angle head with replaceable bevel gears running in ball and needle bearings. Ask for a demonstration of "02" Series Nutsetters and Screw Drivers.



Rotor makes a complete line of portable tools



SPECIFICATIONS

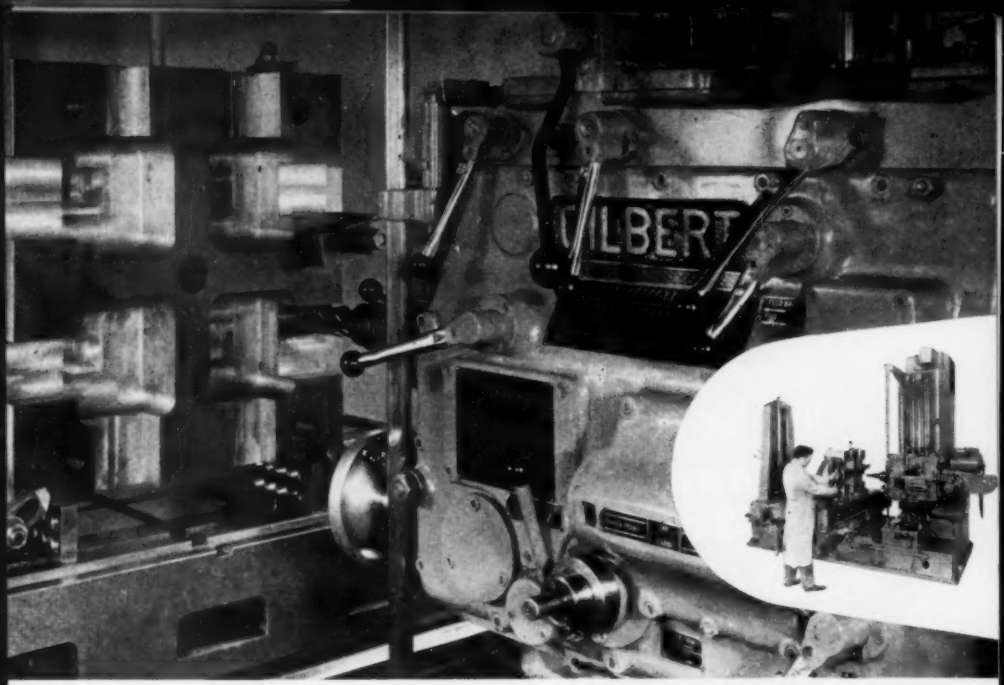
Model	Free R.P.M.	Capacity		Weight (lbs.)	Lgth.	Drive
		Nuts	Screws			
S-02LRA (Reversible)	3200 } 1600 }	To ¼"	To #12	2⅛	10½	¼" Sq. 5/32" Sq.
	680 } 360 }	⅜"	5/16"	2¼	11⅛	⅜" Sq. ¼" Female Threaded

THE ROTOR TOOL CO.
CLEVELAND, OHIO

HIGH CYCLE

AIR

Encircle No. 209 on Card, Opposite Page 65



courtesy Mohawk Tool & Die Corporation and Macaulay Machinery Co.

30 percent savings and ±.001"
... match it with a Gilbert

How's this for a perfect lineup: 30% savings in floor-to-floor time over previous machines, and ±.001" for mating the two chases of a four-cavity carburetor bowl mold.

Mohawk Tool & Die Corp., Rochester, N.Y., gets these savings and accuracy by handling the job on a Cincinnati Gilbert horizontal boring mill.

Here the lower chase (of hot work die steel) is being rough machined. Then it's hardened to a Rockwell of 48-50C scale. Finally, the chase is finish machined with carbide to an accuracy of ±.001" for guide pin and bushing holes, four cavity pockets, and eight slide ways.

Says Mr. George Neward, Mohawk's Secretary-Treasurer: "This job illustrates the flexibility of this type of machine. The ruggedness and stability of the Cincinnati Gilbert has been proven to us without doubt."

The comparatively low cost of adding these advantages to your operations will surprise you. Write for new literature, or—better yet—get a proposal from Gilbert now.

The Cincinnati Gilbert Machine Tool Co., 3366 Beekman Street, Cincinnati 23, Ohio

those who buy Gilbert buy **GILBERT** *again*

GIVE METALS A COLD TREAT

with this NEW low cost **Cincinnati Sub-Zero** Mechanical Chilling Machine



Model A-120-2

STABILIZE ALLOY STEELS by complete change of austenite to martensite.

TOUGHEN METALS, increase hardness and life of perishable tools up to 400%.

STRESS-RELIEVE CASTINGS of magnesium, aluminum and cast iron . . .

with SUB-ZERO Chilling!

- **Capacity: 400 BTU's per hr. at —120° F.**
- **2 cubic foot chamber**
- **All steel construction**
- **Hermetically sealed refrigeration system**
- **Easy "plug-in" installation**
- **Heating unit, observation window, *other* accessories available.**

Complete range of models, sizes, and designs.

WRITE TODAY for catalog and test data.

Cincinnati

Cincinnati Sub-Zero Products

General Offices and Plant

3930 P-6 Reading Road **Cincinnati 29, Ohio**

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now...

ONE COMPLETE REFERENCE FOR YOUR ONE SOURCE OF DIE-SET ACCESSORIES

More than 200 pages featuring the all-new "LEADERSHIP LINE"



Danly's new "Leadership Line" of die sets and diemaker's supplies is a major development in the stamping industry—certain to affect every toolroom and die shop in the country.

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WRITE FOR YOUR FREE COPY TODAY

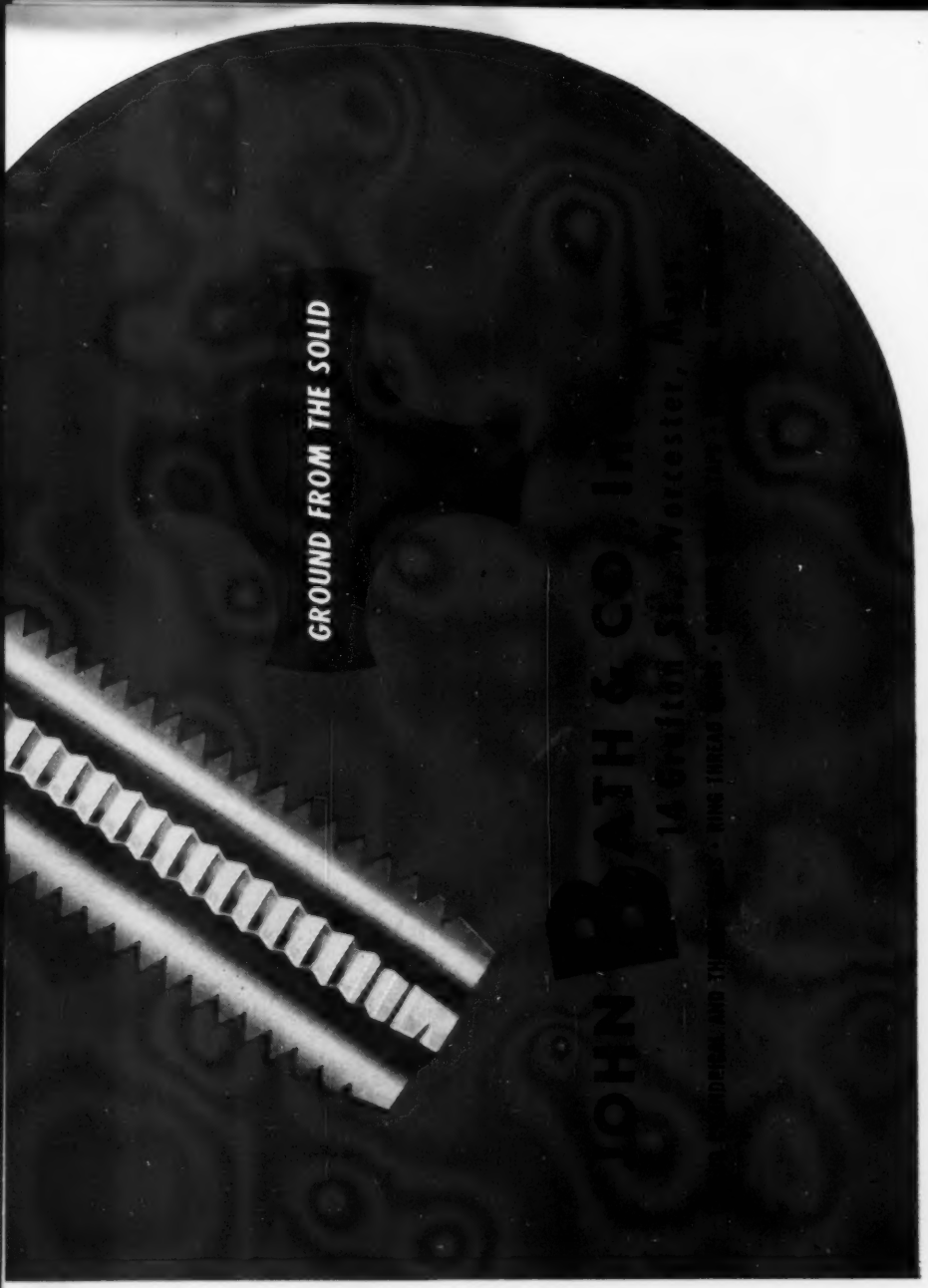
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2100 South Laramie Avenue, Dept. F Chicago 50, Illinois

DANLY

DIE SETS AND DIEMAKERS' SUPPLIES

for the best buy
. . . buy BATH



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MEET
THE MOST COMPLETE CUTTING TOOL LINE
MORSE CARBON TOOLS

"MR. MORSE"

. . . the biggest and fastest all-around man in the cutting tool industry . . . your Morse-Franchised Distributor

He's got the most complete line . . . the right cutting tools for every operation from the automated production lines of the biggest mass manufacturers, to the smallest job shop.

Carbon . . . high speed . . . tungsten carbide, tipped or solid . . . you name it and he's got it . . . *right now, when you want it! He can recommend the right tool for any job*, regardless of tool requirements. That's why Morse means "The Most" in Cutting Tools . . . because your Morse-Franchised Distributor can do *the most* for you . . . any time you call on him. So call on him today for any current requirements.

MORSE means "THE MOST" in Cutting Tools

MORSE TWIST DRILL & MACHINE COMPANY
NEW BEDFORD, MASSACHUSETTS

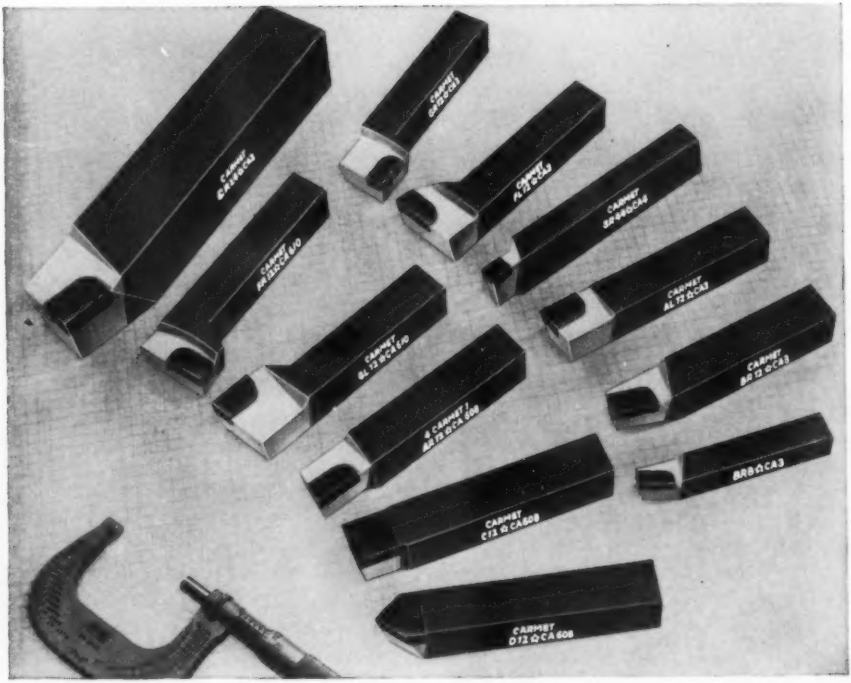
Subsidiary of VAN NORMAN INDUSTRIES, INC.

Warehouses in New York, Chicago, Detroit, Dallas, San Francisco

Buy them by phone from your Morse-Franchised Distributor and save ordering time



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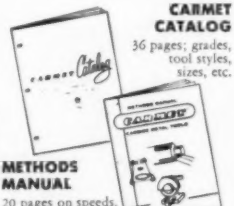
Handle any Cutting Job • • • Cut your Cutting Costs—with

CARMET®

WHAT OTHER JOBS HAVE YOU FOR CARMET TO DO?

We specialize in precision preforming of Carmet carbide metals to *any* shape for special wear-resistance needs, such as dies, gage blanks, etc. Let us quote on *your* requirements.

WRITE FOR YOUR COPIES OF THESE HELPFUL BOOKLETS



CARMET CATALOG
36 pages; grades, tool styles, sizes, etc.

METHODS MANUAL
20 pages on speeds, feeds, cuts, etc.

ADDRESS DEPT. MB-75

The Allegheny Ludlum line of Carmet Carbide Tools is *complete*—every style, size and grade you may need for any cutting job in the shop. If you make your own tools, a full line of blanks is available, too—as well as all necessary grades of AL Tool Steels for back up materials. Extensive stocks of Carmet standard tools and blanks are carried in Distributors' warehouses coast to coast, and special tools are available to order. • Just remember, for best performance on any application, *use Carmet! Allegheny Ludlum Steel Corporation, Carmet Division, Wanda and Jarvis Aves., Detroit 20, Michigan.*

For ALL your CARBIDE needs, call

Allegheny Ludlum

AL® FINE TOOL STEELS SINCE 1854

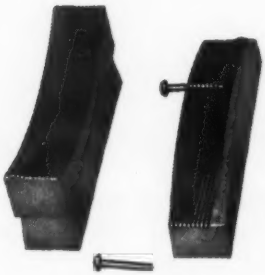
W&D 5570 D

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Prutton

THREAD ROLLING MACHINERY

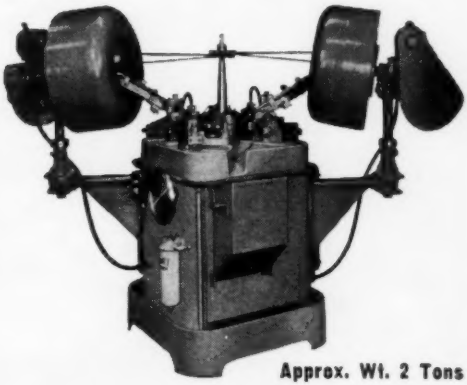
WOOD AND SHEET METAL SCREWS



UP TO 25,000 PCS. PER HOUR!...

Prutton Exclusive Planetary Dies and Thread Rolling Machines are setting new records in regular production of wood and sheet metal screws. The special designed dies are in sections inserted in a planetary holder; easily and economically replaced in case of excessive wear of any part.

The male and female dies shown, roll precision close-tolerance threads to an end point from blanks with square end.



Approx. Wt. 2 Tons

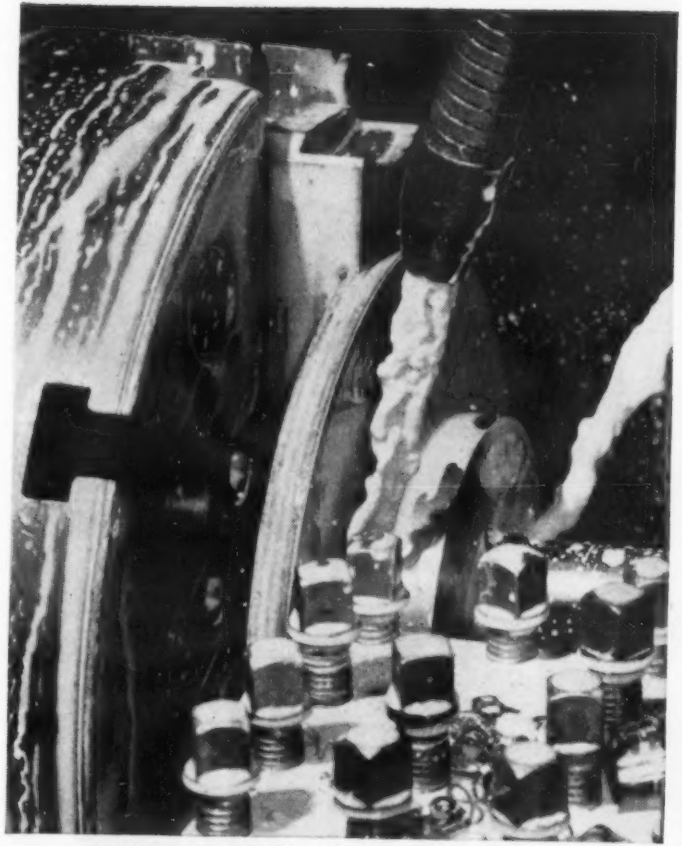
In addition to Type A and Type B Sheet Metal Screws (at a maximum capacity of No. 12 diameter by 2" thread length), Prutton Thread Rolling Machines also produce Wood Screws and Twinfast Wood Screws at record breaking production rates.

Boost your production! Increase your profits! Submit your parts for our recommendations. No obligation, whatsoever.

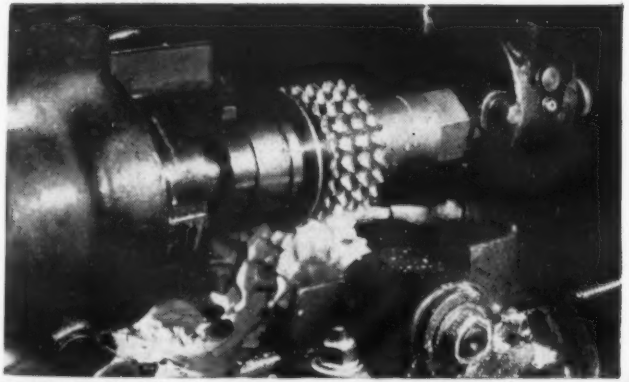
Prutton Corporation

5296 WEST 130th ST. CLEVELAND 30, OHIO

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TURNING AND DRILLING. During the machining of a 9-in. piece using carbide-tipped tools, S.E.C.O. removes heat fast ...assures long runs, top speeds.

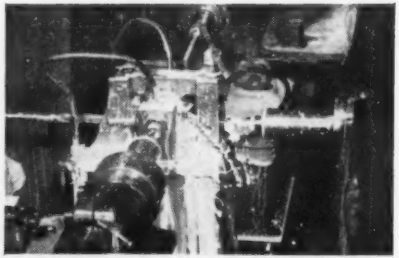


HOBBING. Flooding the cutting edges of a high-speed-steel hob working 1117 steel, S.E.C.O. provides lubricity and cooling power needed for long tool life.



CENTERLESS GRINDING. In grinding 4320 H steel pins, S.E.C.O. keeps wheels clean. Grinding dirt drops out quickly, is not recirculated. Parts are rust-protected.

SUNOCO EMULSIFYING CUTTING OIL HANDLES 4 TOUGH JOBS . . . EASILY



DRILLING AND REAMING. On steel forgings with a 350/400 Brinell, S.E.C.O. keeps the drills cool...gives clean cutting action.

Whether you are shaping, hobbing, grinding, reaming, boring or milling, it will pay you to look into the advantages of SUNOCO EMULSIFYING CUTTING OIL.

Moderately priced, S.E.C.O. has been industry's most widely used soluble cutting oil for years. Higher-than-ever machining efficiency, increased detergency, easier mixing, and other added advantages are helping keep S.E.C.O. the leading emulsifying cutting oil in the country today.

For complete information about S.E.C.O. see your Sun representative. Address SUN OIL COMPANY, Philadelphia 3, Pa., Dept. MT-3.

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INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY

PHILADELPHIA 3, PA.

IN CANADA: SUN OIL COMPANY, LIMITED, TORONTO AND MONTREAL

SUNOCO

ACME HYDRAULIC BENCH PRESSES

as required for your job!



23 DIFFERENT MODELS

to suit your needs and applications

With simple and inexpensive tooling, these versatile hydraulic presses may be arranged for such operations as STAKING, FORCING, CRIMPING, TRIMMING, BENDING, BALLIZING, BROACHING, ASSEMBLING, PUNCHING, FORMING, MOLDING, STRAIGHTENING and many others. In most cases ACME PRESS DIVISION is able to supply complete tooling for YOUR use including required fixtures, index tables or work feed arrangements. Write, wire or phone today for complete information on these useful and productive units.

ACME PRESS DIVISION
ACME BROACH CORP. • MILAN, MICHIGAN

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Brand New!

haskins hask AIR Grinder...

most powerful air turbine grinder in its class!



75,000 R.P.M.
(1/5 H.P. prony brake test)

- **Permanently sealed bearings . . . never needs lubrication in air lines or grinder.**
- **Removable nose piece for deep grinding.**
- **Gyro action of turbine holds tool steady.**

Here's power—SUSTAINED POWER—like you've never experienced before in an air grinder . . . power unexceeded by any other air grinder in the same price range . . . **maintains its high-speed efficiency under load!** Built with a lightweight, contoured, hand-fitting aluminum housing, the Haskins **hask AIR** Grinder handles easily, balances perfectly . . . excellent for the most precise grinding job. Complete kit includes: carrying case, adapter hose, mounted points, dressing stone and wrenches.

for Complete details

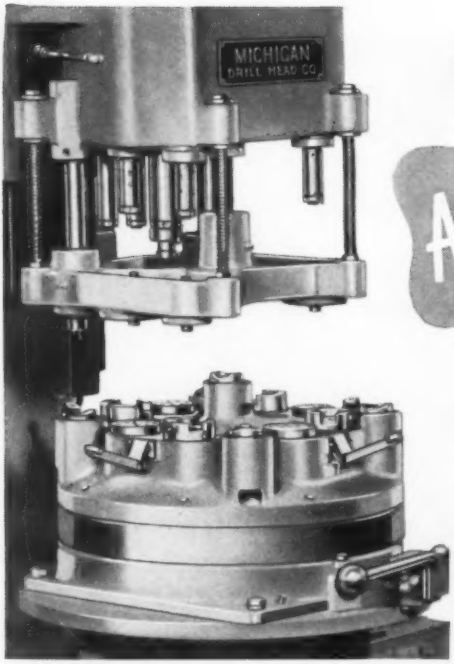
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haskins

HASK-AIR HASK-FLEX

2645 W. Harrison St.
Chicago 12, Illinois

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You can do AMAZING THINGS on a small drill press

YES you can drill, ream and finish bore pressure plates for hydraulic pumps, on the drill press pictured above.

Here's a nine spindle drill head bushing plate and fixture and, a four-station hand operated index table—mounted on a Michigan Hydro 3 Drill Press. It's really amazing!

We also invite your inquiries as to our line of tapping units, and index tables—both manual and automatic—catalog sent on request.

Michigan DRILL HEAD CO. Detroit 34, Michigan

engineers and manufacturers of production machines and drilling equipment

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BURGMASTER® AUTOMATIC HYDRAULIC TURRET DRILLS

with Power Indexing produce a "higher level of quality" at Bendix Aviation Corp., Bendix Products Div., South Bend

They have this to say at Bendix, South Bend where 20 Burgmaster 6 spindle 2BH turret drills are effectively performing numerous secondary operations on aircraft parts —

"The work performed on the Burgmaster 2BH Models was previously run on 6 spindle hand-fed upright drill presses. The benefits derived over the old method of machining are:

1 With the drill fixture clamped in alignment under the spindle, a higher level of quality can be maintained and repair work has dropped to a minimum.

2 Operator works with less fatigue.

3 Uniform hydraulic feed enables us to produce better finishes and size."

Machine tool users everywhere are experiencing these and additional benefits such as: simplified fixturing, extreme versatility—jobs formerly done on turret lathes, chuckers, hand screw machines can be done with ease on the Burgmaster; low initial cost, low maintenance, little floor space required. They are finding that here, in one highly versatile machine, drilling, reaming, counterboring, countersinking, spotfacing, tapping, O.D. threading and many other operations can be accomplished with more accuracy — with one operator.

Automatic hydraulic Burgmaster (6 and 8 spindle models) feature skip indexing, automatic cycling and infinitely variable preselective feeds. All models (including the 6 spindle manuals) provide power indexing, pre-selective spindle speeds and very close preselective depth control.



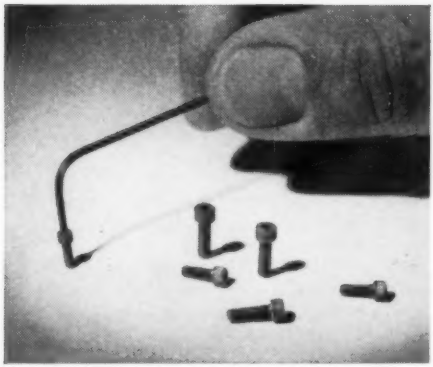
For complete information, address Dept. ***MT3***

BURG TOOL
Manufacturing Company, Inc.
15001 S. Figueroa St., Gardena, Calif.
Sales Offices:
New York • Chicago • San Francisco

Visit our BOOTH NO. 389 • ASTE Industrial Exposition
CHICAGO International Amphitheatre • March 19-23

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Miniature screws aid standardization of small devices



Standard UNBRAKO miniature socket head cap screws are available in sizes # 0, # 1, # 2 and # 3, in heat treated alloy steel or stainless steel, at your authorized industrial distributor's. Standard lengths range from 1/8 to 1/2 in.

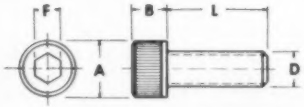
Tiny close-tolerance Unbrako screws available in standard sizes

New economies in the design of space-saving small equipment are now possible with these UNBRAKO miniature socket head cap screws. Manufactured to timepiece precision, available locally, they save the costly necessity of designing special screws to fasten tiny parts in compact units. They're ideal for use in typewriters, calculators and computers, servomechanisms, electric and electronic equipment—and in countless other small intricate devices where maximum reduction in bulk and weight is required with no sacrifice in strength of individual components or assemblies.

Fingers grip the knurled heads on these tiny screws positively for easy handling and fast assembly. Uniform hex sockets assure maximum wrenching torque. Controlled fillets under the heads prevent shearing of the heads. Threads are fully formed for maximum strength and exact fit. Extremely accurate head diameters permit their use in countersunk holes, saving weight by reducing the length of the screw required and making flush designs possible.

These standard UNBRAKO miniature screws are available at your authorized industrial distributor's. See him today. Or write us for Bulletin 2055 and samples. STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

HEAT-TREATED ALLOY STEEL
Class 3 Fit Standard



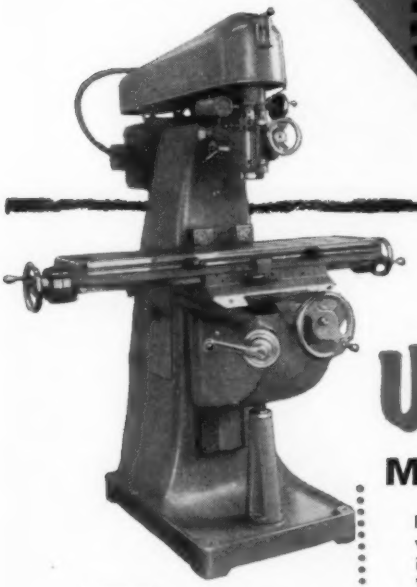
	Diameter	Threads per Inch NC	Threads per Inch NF	Length	Recommended Installation Torque in Inch-Pounds NC	Recommended Installation Torque in Inch-Pounds NF	Weight per 1000 in Pounds
#0	A .104		80	1/8		2.0	.152
	B .060		80	3/16		2.0	.182
	D .060		80	1/4		2.0	.210
	F .050		80	3/8		2.0	.265
#1	A .118		72	1/8	3.5	3.5	.27
	B .073		72	3/16	3.5	3.5	.32
	D .073		72	1/4	3.5	3.5	.37
	F .050		72	3/8	3.5	3.5	.47
#2	A .140	56		3/16	6.0	6.0	.42
	B .086	56		1/4	6.0	6.0	.50
	D .086	56		3/8	6.0	6.0	.58
	F 1/16	56		1/2	6.0	6.0	.70
#3	A .161	48		3/16	8.5	9.5	.59
	B .099	48		1/4	8.5	9.5	.70
	D .099	48		3/8	8.5	9.5	.81
	F 5/64	48		1/2	8.5	9.5	1.03

Standard screws are threaded to the head. Special materials, lengths, and threaded lengths are available. One "High-Titan" UNBRAKO hex key is included with each package of 100 screws.

UNBRAKO® SOCKET SCREW DIVISION
STANDARD PRESSED STEEL CO.
sps
JENKINTOWN PENNSYLVANIA

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Choice of hand or
power feed head and table



BALANCED RIGIDITY

assures
*CERTIFIED
ACCURACY

in the NEW

U.S.Vertical
MILLING MACHINE

Balanced rigidity, the key to accuracy for vertical and angular milling operations, is an integral part of the new U. S. Vertical Milling Machine.
These U. S. Vertical features provide rigidity for close tolerance work:

- Machine weighs 2000 pounds
- Extra wide bearing surfaces
- Motor mounted behind column, balances weight of head, resists vibration and deflection
- Major castings are internally ribbed, normalized, stress relieved, and internally braced
- Dovetails are deep and hand scraped
- Massive knee, saddle and table

Drive by B section V belt

***Tested 10 Ways!**

The accuracy of each U. S. Vertical Milling Machine is certified. A check sheet accompanies every machine listing 10 exacting operational tests the machine has passed. The check shows allowable tolerances and actual measured tolerances of the individual unit. A new bulletin provides complete specifications and illustrates various accessories available on the new U. S. Vertical Milling Machine. Write for your *FREE* copy today.

U·S·Burke
MACHINE TOOL DIVISION

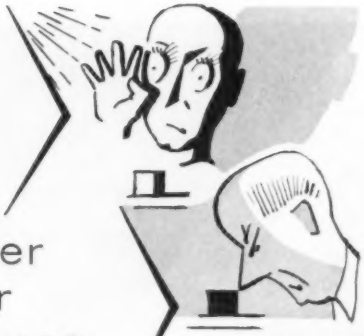
1 Brotherton Road
Cincinnati 27, Ohio

Manufacturers of:
Burke Bench Mills, U. S. No. Milling Machine and the radically new U. S. Quartet

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never
over
intense

never
under
intense



VIMCO *Lights*

adjust easily for soft, comfortable non-fatiguing light!

Don't neglect adequate light for precision machine work. Install Vimcolights on your machines to boost worker efficiency. Vimcolights are never over-intense . . . never under-intense! Because of their high degree of adjustability, they supply the 'just right' light that eliminates wasteful eye fatigue during long periods of steady machine operation. Easy to install. Sturdy for life.



Machine Builders: Send for "OEM Bulletin".

Production Men: Send for "Bulletin 85".

Vimcolights are (UL) LISTED



VIMCO MFG. CO., Inc.
Since 1919

109 BRAYTON STREET
BUFFALO 13, NEW YORK

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IN MOST SET-UPS

THE WORK IS HELD RIGID... THE GRINDING WHEEL TRAVERSES...

PROVIDING
- EXTREME ACCURACY
- SIMPLICITY
- ECONOMY



THE
Oliver ACE
CUTTER GRINDER

Look into the advantages of the Oliver Ace . . . Replace outdated methods and save. With the Oliver Ace, two fixtures handle a complete range of tool and cutter grinding. Two models are provided . . . Heavy-Duty Model illustrated for tungsten-carbide cutters and tools, and Standard Model for high speed and light duty carbide grinding. The Oliver is better for sharpening:

- ★ SIDE AND FACE CUTTERS
- ★ FACE MILLS AND END MILLS
- ★ SLAB MILL CUTTERS
- ★ ANGLE CUTTERS
- ★ COUNTERBORES
- ★ COUNTERSINKS
- ★ REAMERS
- ★ SPOT FACING CUTTERS

THE OLIVER ACE WILL HANDLE NEARLY ALL CUTTER GRINDING REQUIREMENTS. EXCELLENT FOR THE SHARPENING OF TUNGSTEN-CARBIDE TIPPED CIRCULAR WOOD SAWS.

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FACE MILL GRINDERS • AUTOMATIC DRILL GRINDERS • DIE MAKING MACHINES
TOOL & CUTTER GRINDERS • DRILL POINT THINNERS • TEMPLATE TOOL GRINDERS

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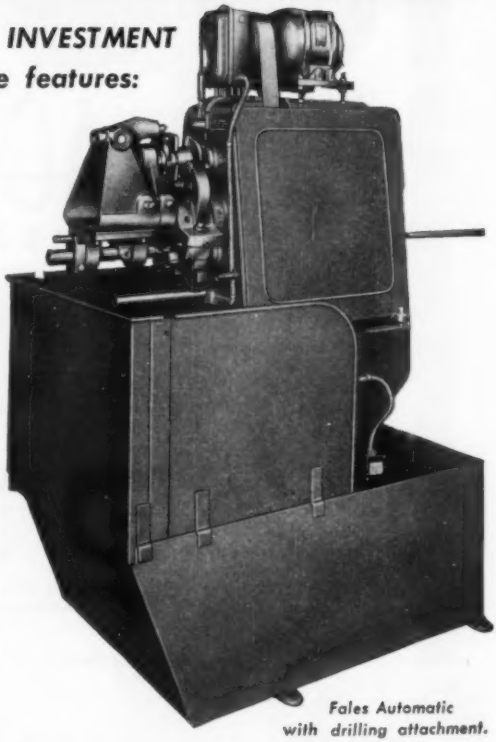
LOW COST — HIGH PRODUCTION

Fales Automatic Forming and Cut-off Lathe

(U.S. Patent 2,373,155)

YOUR MOST PROFITABLE INVESTMENT
because of these unique features:

1. Speedy production . . . rapid work cycle.
2. Chips break automatically and drop into base container.
3. Versatility of job application . . . including axial drilling.
4. Rugged construction permits heavy forming cuts on stock diameters up to 1" — with precision and fine finish.
5. Designed to handle metal and plastics up to 1" round, ⅞" hex and ¾" square.
6. Easy to operate — controls and adjustments conveniently located in front.
7. Lower cost than machines of comparable capacity.
8. Compact — requires minimum floor space.



Fales Automatic with drilling attachment.

BUILT BY FALES . . .
over 60 years experience in machine design and construction.

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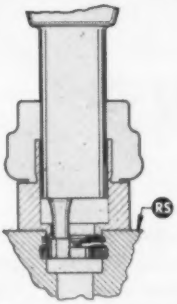
L. F. Fales Machine Company

Northeast Street Walpole, Mass. U. S. A.

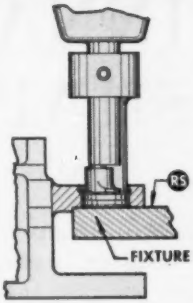
Established 1894

Manufacturers of LUDLOW TYING MACHINES • MULTIPLE NEEDLE SEWING MACHINES • FALES and SEEYLE DIE PRESSES • PAPER SLITTERS and REWINDERS • AUTOMATIC FORMING and CUT-OFF LATHES • CLICKING MACHINES

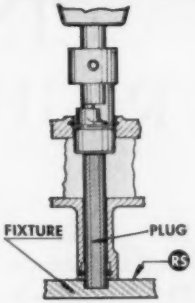
Even Unskilled Labor Can Use This Versatile Tool Accurately! It Simplifies Internal Grooving Problems, Cuts Production Costs!



A) Cuts two grooves of different depths and widths in one single operation from same reference surface.



B) Cuts groove in bore located in protruding member of workpiece. Reference surface on under side of protrusion.



C) Cuts grooves in two bores of different diameters from same reference surface. Tool banks on reference surface. Then workpiece is reversed and tool banks on plug.

Amazingly versatile! Your toughest recess cutting problems can be met simply and efficiently with the Waldes Truarc Grooving Tool because it offers a whole range of possibilities beyond the range of ordinary recessing tools.

Wide Cutting Range! The Waldes Truarc Grooving Tool comes in 5 models... enabling you to cut accurate grooves in housings with diameters from .250 to 5.00 inches.

Send Your Problems to Waldes! Send us your blueprints... let Waldes Truarc Engineers give you a complete analysis, price quotation and delivery information on the most economical tool set-up for your particular job. There is no obligation!



Write NOW for a 20-page manual containing full information on Waldes Truarc Grooving Tool



WALDES TRUARC® GROOVING TOOL

Made by the Manufacturers of Waldes Truarc Retaining Rings
WALDES KOHINOOR, INC., 47-16 Austel Place, L. I. C. 1, N. Y.
Waldes Truarc Grooving Tool Manufactured Under U. S. Pat. 2,411,426

Waldes Kohinoor, Inc., 47-16 Austel Pl., L.I.C. 1, N. Y.

Please send me your new 20-page technical manual on the Waldes Truarc Grooving Tool. MT038

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CINCINNATI RIGID SHAPERS

New—modern—these Rigid Shapers offer faster, more convenient controls, greater accuracy, greater dependability. The New nodular iron ram, trunnion and vise, and wide heavily ribbed column give a new rigidity—increase accuracy in cutting.

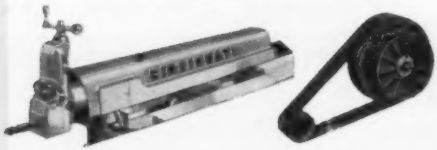
The New slot-free ram also eliminates the manual clamping of ram adjustment—a time saving feature.

A speedy, dependable electro-magnetic brake and clutch insure a faster performance.

50 P.S.I. pressure lubrication, exclusive on Cincinnati Shapers, is a real insurance against wear and a guarantee of long trouble-free performance.

Write for the circular on the New Rigid Shapers.



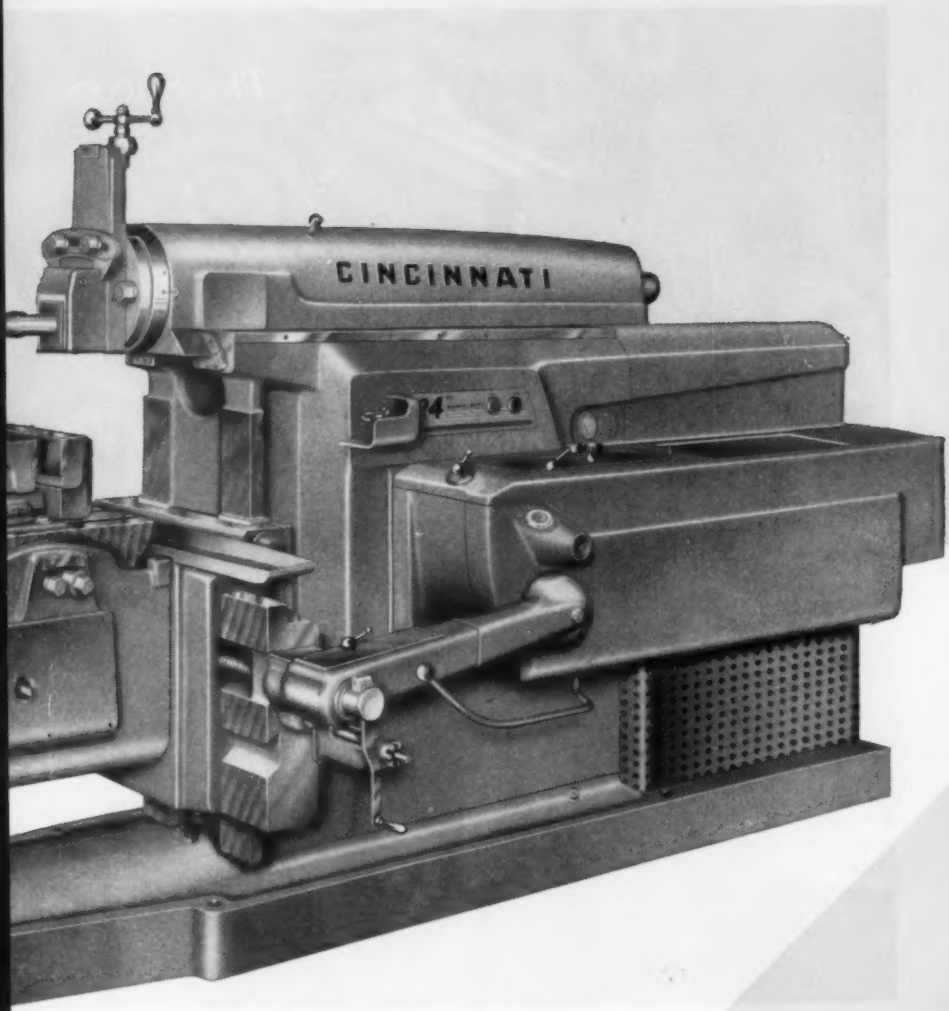


Nodular iron, slot-free ram

Electro-magnetic Clutch and Brake



The only shaper with 50 P.S.I. lubrication

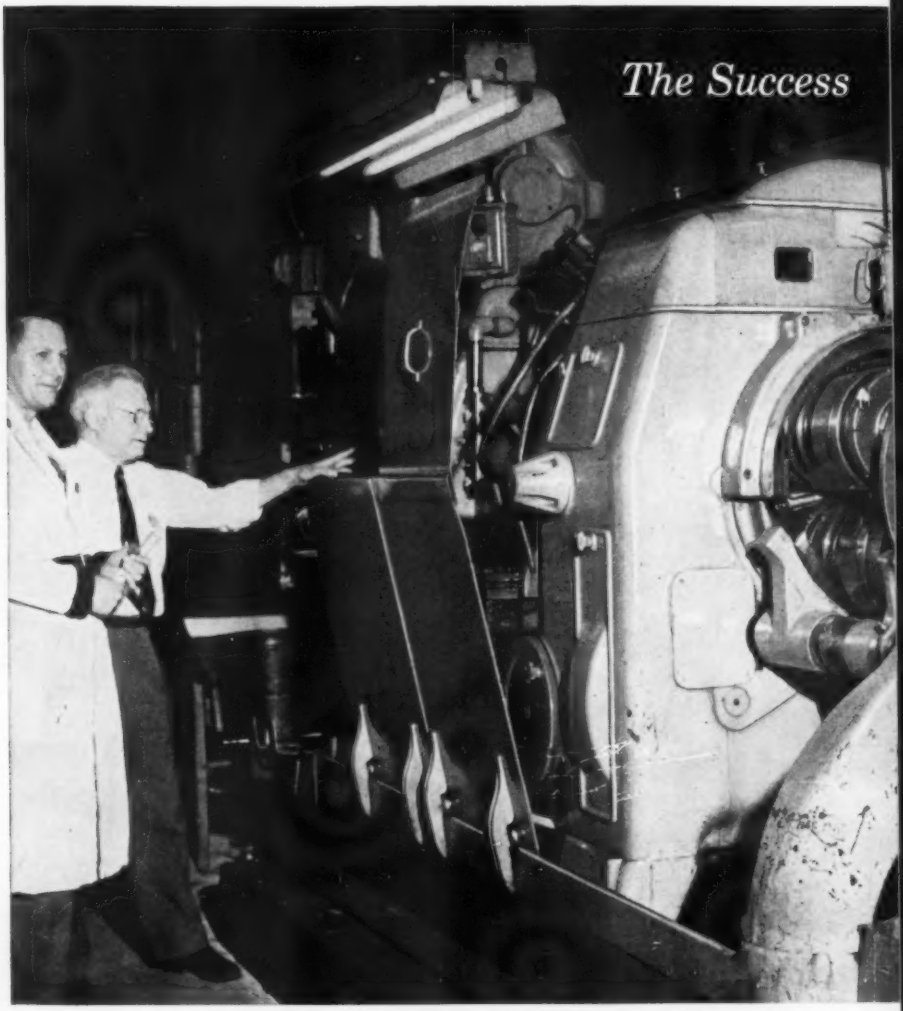


Cincinnati Shapers, Shears and Press Brakes carry a 5 year guarantee on workmanship and material—write for details.

THE CINCINNATI SHAPER CO.

CINCINNATI 25, OHIO, U.S.A. SHAPERS • SHEARS • BRAKES

CINCINNATI



More than a "Coolant" is needed

Plants in: Chicago, Detroit, Cleveland, Hartford, and Toronto, Ontario.

Branch Warehouses and Representatives in principal metal working centers in the United States, Canada and Europe.



Story of

SPEEDKUT "A"

. . . a boost for screw machine output!

The Success of SpeedKut A . . . is an oft repeated story of increased output, better tool life and less downtime.

SpeedKut A is a product of Stuart's sulpho-chlorination processing that provides absolute uniformity and stability. Highly effective chemical additive materials are pre-balanced under strict laboratory supervision to instill SpeedKut A with the anti-weld and friction reducing characteristics necessary to the range of machining operations for which it is recommended.

When selecting a cutting fluid, factors to be considered are material being machined, material hardness, speeds, feeds, depth of cut and machine design. Cullman Wheel Company, Chicago, Ill., a leading sprocket manufacturer, took all these factors into consideration more than 10 years ago. They chose SpeedKut A then and still use it for their multi-spindle automatics to cut sprocket blanks from free machining bar stock and for hobbing the sprocket teeth.

"The Man in the Barrel", your Stuart Representative, will be happy to help you take all of the factors into consideration. Ask to have him call—and ask for a Stuart's Cutting and Grinding Fluid Selector and Dilut-O-Graph Folder, too. It's a quick guide to starting recommendations for any job.

D. A. STUART OIL CO., LTD. 2749 S. Troy St., Chicago 23, Ill.



Stuart Oils

Time Tested Cutting Fluids and Lubricants

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IT'S THE NEW, "YEARS-AHEAD" LINE ..

Far out front on every point of comparison



COMPLETE LINE FROM 50 TO 775 TONS

NIAGARA
MACHINE & TOOL WORKS
1879 75 1954

America's Most Complete Line of Presses, Shears, Machines and Tools for Plate and Sheet Metal Work

...NIAGARA

ALL STEEL PRESS BRAKES

"MULTI-MACHINE" VERSATILITY TO BOOST PRODUCTION

Practically limitless in their scope of forming, bending, punching, blanking and related operations, Niagara Press Brakes get more done for you because they do more jobs. One reason: Advanced design. Another: The extensive line of Niagara Press Brake Dies available.

UNIFORM BENDS WITH STRAIGHT-EDGE ACCURACY

Double end twin drives with double reduction gearing, *on all models*, provide uniform, constant application of power at both ends of the ram. Off-center loading presents no problem.

Rugged, streamlined frames feature box type crowns of unequaled strength and rigidity, assuring maximum resistance to deflection and permanent alignment of bearings and ram.

3-SHIFT STAMINA TO HANDLE WORK-HEAVY SCHEDULES

Close attention has been given to every design detail. Nothing has been overlooked. Each frame size has been scientifically tested to detect and eliminate harmful stresses at all critical points.

Laminated non-metallic ways, an exclusive Niagara feature, reduce wear to an absolute minimum, providing accurate alignment and longest possible service life. All gearing is totally enclosed in sealed oil baths for thorough, clean lubrication.

Once again, Niagara's forward-thinking engineering has produced a metal working machine years ahead of its time. As you become familiar with the significant developments embodied in this revolutionary new line of all steel press brakes, you will realize why it carries the Niagara nameplate. After all, who is more uniquely qualified to be its builder than the builder of America's most famed and most complete line of presses, shears, other machines and tools for plate and sheet metal work?

Call in your nearest Niagara representative at once. Let him tell you, *in detail*, what these great, new press brakes can do for you.

CHECK ALL THE FACTS, YOURSELF!

Compare. Make a careful, feature-by-feature appraisal of Niagara's years-ahead press brake design. Write for new Bulletin 89C . . . the most comprehensive press brake literature ever published.

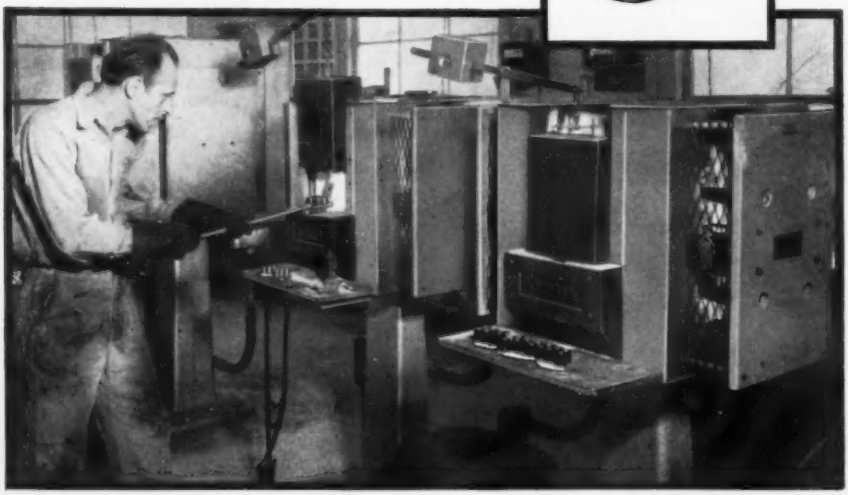


NIAGARA MACHINE & TOOL WORKS
BUFFALO 11, N. Y.
DISTRICT OFFICES:
Buffalo • Cleveland • Detroit • New York
Philadelphia
Dealers in principal U. S. cities and major foreign countries

engineered to expand your output ...AT SAVINGS!

LOW PRICED MOLY for HIGH GRADE TOOLS?





SENTRY FURNACES employing the positive Sentry Diamond Block atmosphere harden all high speed and air hardening steels including the low-priced molybdenum steels, consistently without spoilage, true to size and completely free from scale or decarburization.

Many users of Sentry equipment are regularly hardening the M-10 and other "difficult" steels with absolutely no "decarb" — producing high quality tools from lower cost steels.

Like the manufacturer of the above shown struck slot hammer, you, too, can save money with a Sentry installation.

Consult Sentry for free demonstration hardening on your own tools.



Request Catalog L-27

Write

Sentry TRADEMARK **ELECTRIC FURNACES**

SENTRY DIAMOND BRAND

THE SENTRY CO. • FOXBORO • MASS.

Encircle No. 231 on Card, Opposite Page 65

Now... Tapping

SPEED! SPEED! SPEED!

Here's the new high speed tapping attachment for SHORT RUNS—CONTINUOUS PRODUCTION—AUTOMATION!

with the SUPER Jarvis TORQOMATIC

Permanently lubricated ball and needle bearings throughout!

Helical gears—1 to 1 reverse ratio!

Toggle-type clutch gives ultra-sensitive forward and reversing response.



For *high speed* production tapping—Jarvis TORQOMATIC pays for itself over and over again!

Single collet performs full range of tapping operations.

Here's the business end of the TORQOMATIC . . . gives phenomenal tapping SPEED!

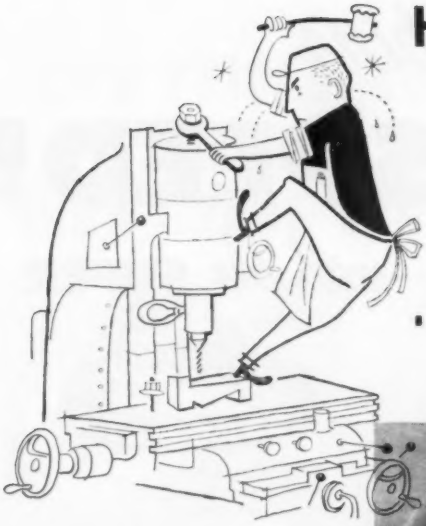


WRITE NOW!
Send for bulletin and prices

Jarvis
CORPORATION
POWER TOOLS FOR INDUSTRY
DEPARTMENT 6,
MIDDLETOWN, CONNECTICUT

SEE US AT BOOTH NO. 1401 — A.S.T.E. SHOW

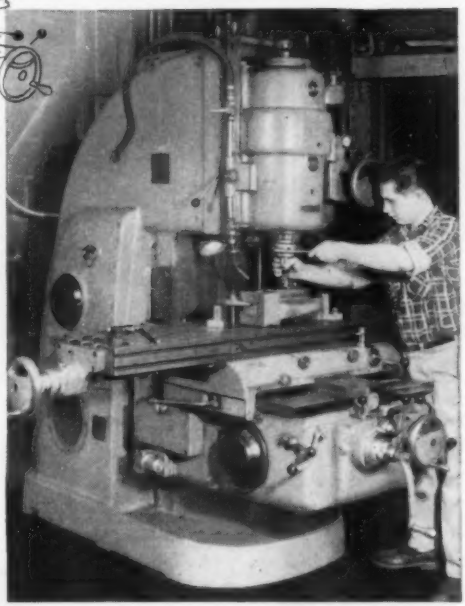
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HOW MODERN IS *YOUR* METHOD?

...THIS

... or *THIS*



The modern P.D.Q. tooling method completely eliminates the time lost in changing old fashioned type tools. No more "sweating out" loosening and tightening the draw bolt. A 60° turn of the lock nut and you're ready for another tool. P.D.Q. tool changes are only a matter of *seconds* . . . and tools are available in very small, small, medium and large series depending on the application. Write for literature covering all the advantages of modern, cost cutting P.D.Q. (Portage Double Quick) tooling.

BOOTH NO. 669 AT THE ASTE SHOW

REPRESENTATIVES IN PRINCIPAL CITIES

PORTAGE Double-Quick TOOL CO.

1037 SWEITZER AVENUE • AKRON 11, OHIO

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For heavy duty precision drilling . . .

It's a

Jacobs

CHUCK

Jacobs and your industrial supply distributor are ready to deliver the chucks you need and the service you deserve. First in chucks . . . first in service.

THE JACOBS MANUFACTURING COMPANY • WEST HARTFORD, CONN.



The Jacobs Model 91 Spindle Nose Collet Chuck for tool room and engine lathes.



The Jacobs Rubber-Flex® Tap Chuck for tapping heads and impact tools.



The Jacobs Ball Bearing Super Chuck for heavy duty and precision industrial use.



The Jacobs Model 96 Collet Chuck for grinding machines, millers and jig-borers.

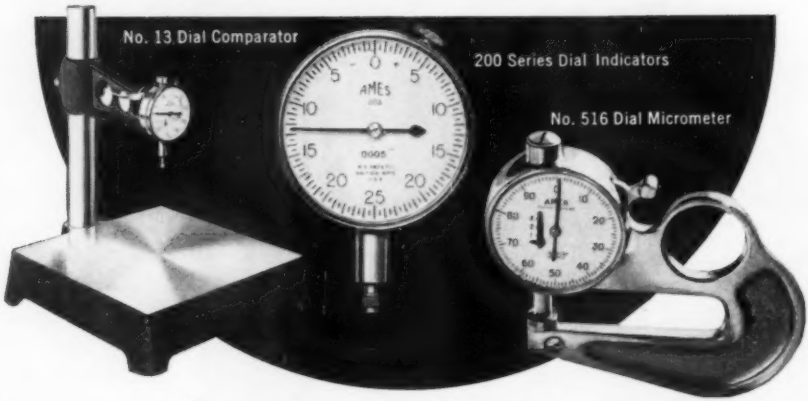


The Jacobs Plain Bearing Chuck for drill presses, portable electric and air tools.



The Jacobs Impact Keyless Chuck especially designed for the aircraft industry.

AMES



. . . *the preferred on every job*

for time-saving accuracy and dependability

Today, as for the past half century, Ames instruments are solving industry's toughest measurement problems, while providing unquestioned accuracy through millions of cycles.

We will gladly make recommendations on your measurement problems. Please send prints and specifications. And ask for your free copy of the Ames catalog.

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ASTE Show
March 19-23

Representatives in principal cities



B.C. AMES CO.

28 Ames Street, Waltham 54, Mass.

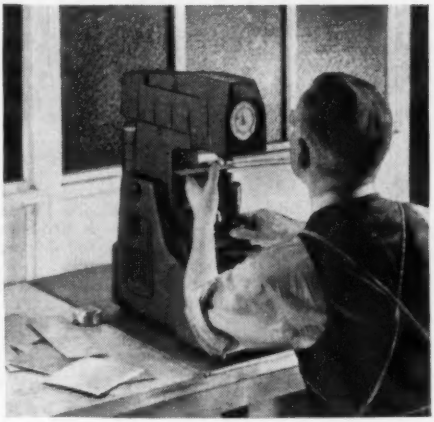
MANUFACTURER OF MICROMETER DIAL GAUGES • MICROMETER DIAL INDICATORS

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ACCO products

Wilson "Rockwell"* Hardness Testers

Is HARDNESS an important factor in your business?



• If your business involves metals or, in many cases, plastics, successful operation often requires *exact* knowledge of the proper hardness of the materials you make or work with.

IN HEAT TREATING DEPARTMENTS—

WILSON "ROCKWELL" testing of hardened and tempered steels is almost universal. This is especially true for plain carbon and alloy steels. It is as easily done by a production worker as a metallurgist.

IN METALLURGICAL LABORATORIES—

They provide means for establishing thousands of hardness specifications. Their use insures quality of product, reduces defects and maintains good name and reputation.

IN TOOL ROOM OR PRODUCTION

They are relied upon for absolute guidance as to the hardness of tools and the metals to which they are applied. They are also ideal for production testing. Each test may take as little as 3 to 5 seconds.

• For complete information on WILSON "ROCKWELL" Hardness Testers call or write today. There is a WILSON model to meet every testing requirement.

**Trademark registered*

See the WILSON line at BOOTH 909 at the ASTE Show, Chicago, March 18-23

ACCO

Wilson Mechanical Instrument Division
AMERICAN CHAIN & CABLE

230-T Park Avenue, New York 17, N. Y.

for Better Value

Encircle No. 236 on Card, Opposite Page 65

GETTING BETTER THREADS

. . . in Less Time . . . at Lower Costs is Coulter Magic!

Day-in and day-out production figures show that COULTERS produce threaded parts FASTER . . . AUTOMATICALLY . . . on non-ferrous and heat treated metals . . . long and short runs . . . all sizes, diameters and lengths . . . high speed production milling. COULTERS start earning their way the moment you make the first threads. Perform with accuracy and ease of handling normally found only on much heavier, more expensive machines.

THREE COULTERS *for your threading needs*

Each machine has its own design features; engineered for low and high speeds, quick changeovers, individual versatility.

1

"H1" Completely automatic for precision internal and external right and left hand threads, 4 to 50 per inch. Internal: 5/8" to 8". External: 3/16" to 7".

2

TYPE "A" MODEL "L1"
This is the most versatile lathe built for fast production of Square, Standard and 29 degree threads, internal and external. Has over 25 alternatives for setting up the threading tools. Capacities: up to 195" length of thread.

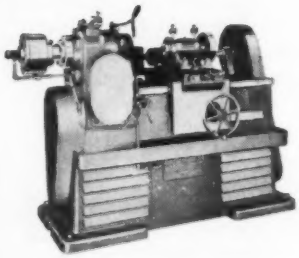
3

"THREADMASTER" Produces, automatically, long and short traversing, elevating, cross feed lead screws with over 55 changes of the work spindle. Mills threads from 1/3 to 20 per inch and leads from .05 to 5.5".

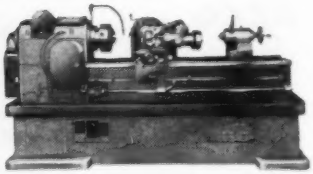
Ask your COULTER Dealer about them today, or write direct.

The James Coulter Machine Co.
Machine Tool Builders Since 1896
637 Railroad Ave., Bridgeport 5, Conn.

Coulter Threading Machines







Encircle No. 237 on Card, Opposite Page 65



Costly Gear Repairs Ended by Norgren MICRO-FOG Lubrication

... *Acid fumes "locked out" of gear boxes on plating tanks at Wagner Electric Corporation*

THE PROBLEM:

At the Wagner Electric Corporation, St. Louis, baskets containing parts to be zinc plated in a hot acid solution are mechanically agitated by a gear drive.

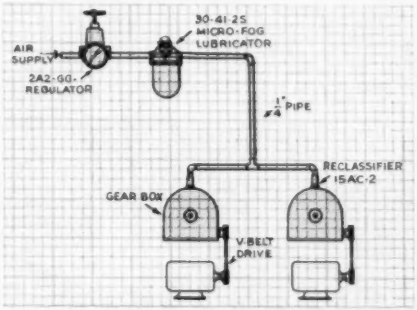
With the former drip feed lubrication method, acid fumes entered the gear boxes, contaminating the lubricant and destroying the gear box seals. Loss of lubricant, hot-running gears, plus corrosion by the contaminated lubricant greatly accelerated gear wear.

THE SOLUTION:

Three years ago the Norgren Micro-Fog System shown above was installed to lubricate the gears on two plating tanks. MICRO-FOG is an air-borne suspension of extremely small oil particles (.00007874" or less in diameter). Because the oil particles are so small, they can be conveyed long distances through complex piping systems without reclassifying and flooding the lines with oil.

THE RESULTS:

Norgren MICRO-FOG automatically coats the gears with a continuous film of fresh oil, reducing gear wear and corrosion. The Norgren Pressure Regulator maintains a constant pressure



in the gear boxes, preventing entry of acid fumes. Oil seals are eliminated. Much less lubricant does a more thorough lubrication job—with a substantial saving in lubricant cost. Maintenance costs have been radically reduced.

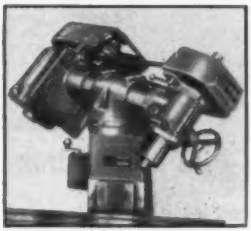
Without obligation, learn how Norgren Micro-Fog Lubricators can provide more efficient lubrication and reduce costs in your plant. Call your nearby Norgren Representative, listed in your telephone directory—or **Write the Factory for New No. 700 Catalog.**

C. A. NORGREN CO.
3438 So. Elati St. Englewood, Colo.

Pioneer and Leader in Oil-Fog Lubrication Since 1930

"CLAUSING VERTICAL

are perfect for all milling operations within their capacity!"



The Heart of the CLAUSING MILL is its rigid, high precision spindle head. It has 7 ball bearings — spindle is chrome nickel steel, hardened and ground — quill, ground and hard chrome plated, has full-length honed bearing seat — overarm is an electric furnace casting, with ¾" thick walls, precision ground.



SEE YOU AT THE ASTE EXPOSITION
INTERNATIONAL AMPHITHEATRE
CHICAGO
BOOTH 1418 **MARCH 19-23**

Grazale Tool and Gauge, Inc., East Detroit, Michigan, specialists in experimental work on precision aircraft and automotive parts, and on three-dimensional cams, have this to say about the Clausing milling machines: "Clausing mills are perfect for all milling operations within their capacity. We like them especially well for small-parts work — they are accurate, sensitive, easy to set up — and, they are economical in that they eliminate tieing up larger, more costly machines on small-parts operations."

The New CLAUSING VERTICAL MILLER is a *precision* machine tool designed for jig, die and fixture making . . . pattern, experimental and tool room . . . and general production milling. Many new and exclusive features give it greater versatility and ease of set-up and operation than have ever been available in a miller at or near its price — now only $795.00, F.O.B. Factory. Your CLAUSING dealer will gladly give you complete information on this outstanding machine — call him today!

MOST ACCURATE MACHINE OF ITS TYPE!

The CLAUSING Vertical Miller is the most accurate machine of its type and price! Before it leaves the factory each CLAUSING must pass rigid tolerance tests — such as:

1. Top of table perpendicular to column ways, both directions, within .0005" in 8" travel.
2. Table top, front to back, square with column ways 0 to .001".
3. Table, parallel to turret within .001".
4. Spindle square with table, front to rear, within .001" T.I.R. in 5" circle.
5. Spindle taper (internal) run out within .0002" at spindle nose.
6. Table T-slots parallel to table dovetail ways within .0005" in 8" longitudinal travel.

CONDENSED SPECIFICATIONS

Size of Table	6" x 24"
Longitudinal Table Travel	15"
Transverse Table Travel	5"
Vertical Table Travel	11⅛"
Maximum Distance Spindle to Table	11⅝"
Maximum Distance Spindle to Column	8¾"
Quill Travel	3"

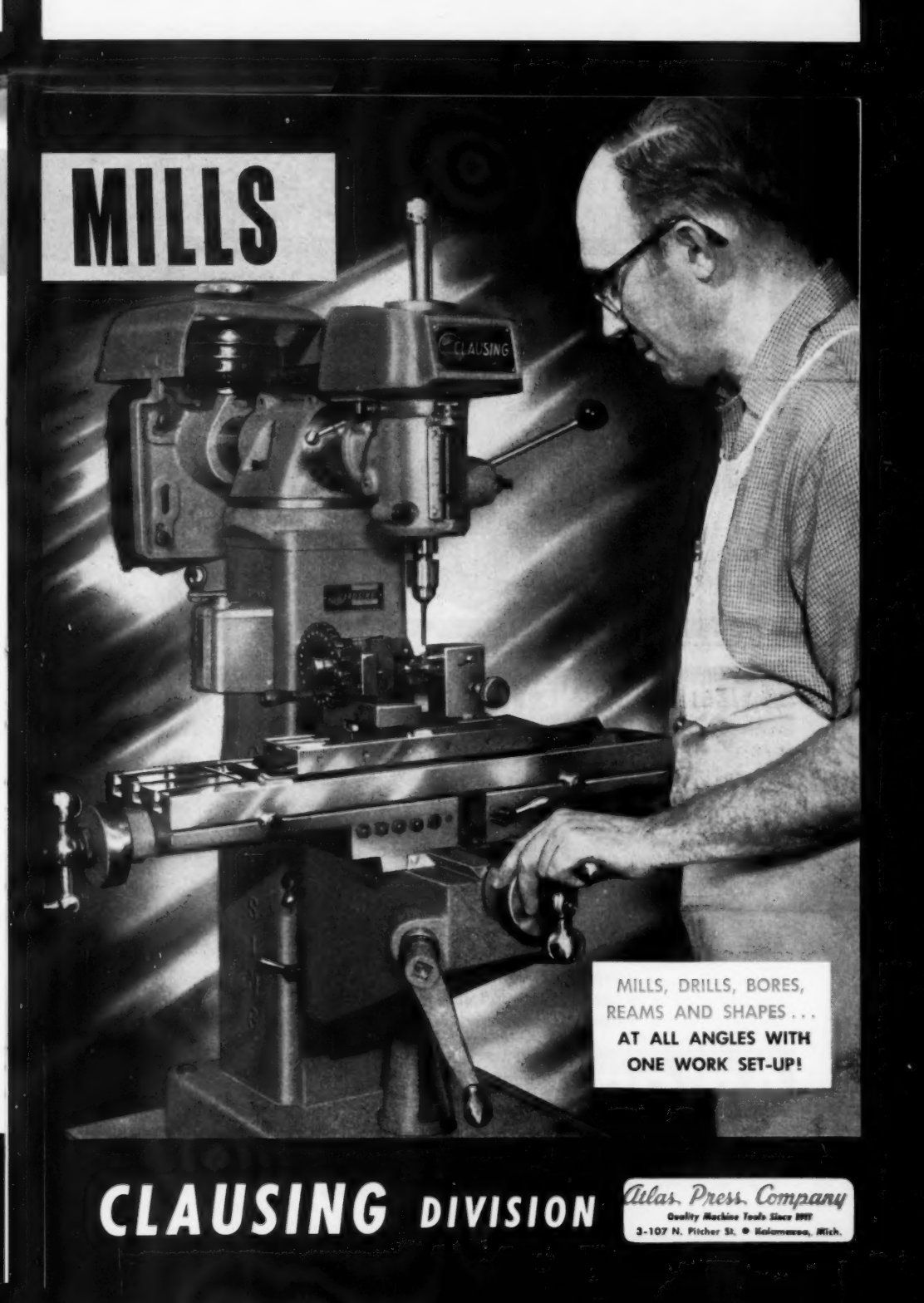
Spindle Speeds: Six, 180 to 3250 R.P.M. — No. 7 Brown and Sharpe or No. 2 Morse Taper Spindle, Optional — Operates from ½ or ¾ HP, 1725 R.P.M. Motor.

NOW ONLY $795.00 F.O.B. FACTORY

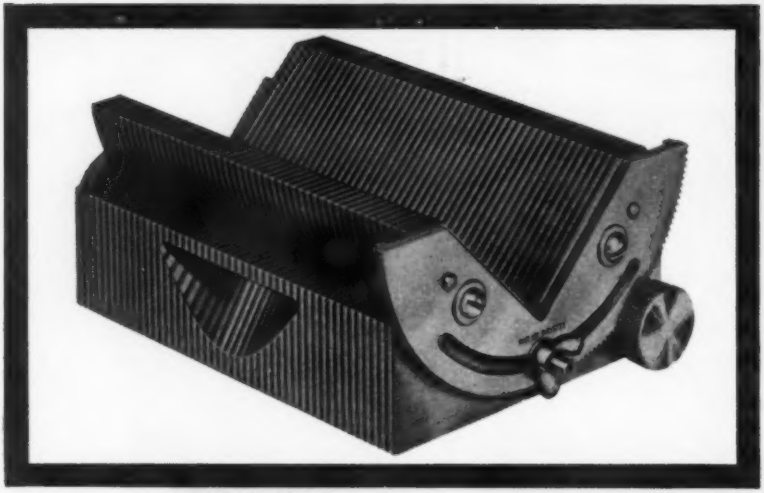
Write **FOR ILLUSTRATED LITERATURE!**

Atlas CLAUSING PRECISION MACHINE TOOLS — ATLAS PRESS COMPANY

the PLUS VALUE LINE


MILLS
CLAUSING
MILLS, DRILLS, BORES,
REAMS AND SHAPES . . .
AT ALL ANGLES WITH
ONE WORK SET-UP!
CLAUSING DIVISION
Atlas Press Company
Quality Machine Tools Since 1917
3-107 N. Pitcher St. • Kalamazoo, Mich.

precision setup for precision grinding



with the new

ANTON MAGNETIC ADJUSTABLE V-BLOCK

This unique precision workholder permits quick and accurate setups, saving time, effort and money in grinding operations.

Laminations are held without pins or rivets and cannot shift, and a laminated insert is furnished FREE for larger, flat work. The Anton Adjustable V-Block can also be used on drill presses or other machines equipped with magnetic chucks.

Compare these distinctive features:

- **Parallelism: ±.00005" over entire length**
- **Maximum setting: 90° angle**
- **Vernier accuracy: ±15 seconds**
- **Size: 6" long, 4½" wide, 2½" high**
- **Unsurpassed for layout, toolroom and production**

Write today for complete technical data to:

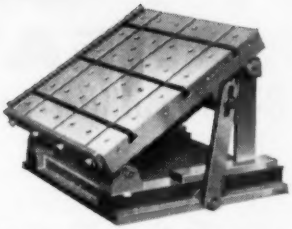
Anton Machine Works
1226 Flushing Avenue, Brooklyn 37, New York

Standard & Magnetic Parallels • Standard & Adjustable V-Blocks • Diamond Holders • Milled Blanks

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Robbins ...THE COMPLETE LINE OF ANGULAR TOOLING EQUIPMENT

Save dollars in valuable tool room time on every job! Set-ups that require hours by other methods take minutes the Robbins way. Just four simple steps: (1) Look up required angle in Table of Constants furnished with each tool, (2) Select gage blocks from the Table, (3) Place gage blocks between base of unit and sine bar swivel block, (4) Secure the work . . . and you're ready to go! Complete range of models and sizes brings Robbins precision equipment within the reach of every shop, large or small.



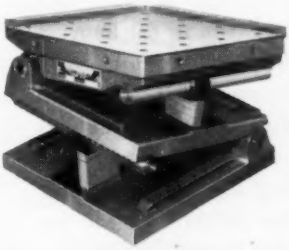
HEAVY DUTY SINE PLATES FOR MILLING AND BORING

Fool proof! Rugged enough to take thrust and chatter of heavy cuts . . . yet built to tool room accuracy for the most exacting inspection operations.



"MAGNA-SINE" MAGNETIC TABLES FOR PRECISION GRINDING

Set up and grind any single or compound angle fast! Work is held securely by magnetic attraction, clamped or released in an instant. Work can't warp or move.



INSPECTION SINE PLATE FOR EVERY INSPECTION OPERATION

Eliminate chance of errors in inspection department and tool room! No more V-blocks, angle plates, or complicated built-up sets of blocks. Simple, fast and sure.

Write or call for complete information now!

OMER E. Robbins COMPANY

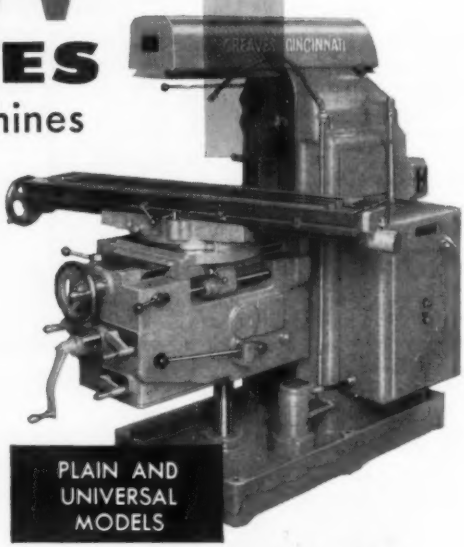
24800 PLYMOUTH ROAD **Dept. A** **DETROIT 39, MICH.**

Also producers of special machinery, gages and fixtures

SEE ALL ROBBINS PRODUCTS IN BOOTH 416—ASTE SHOW

new GREAVES 3-XH Milling Machines

more power at the cutter!



PLAIN AND UNIVERSAL MODELS

The completely new GREAVES No. 3-XH Milling Machine brings added versatility, increased operational ease, and more power where it's needed most . . . *at the cutter!*

It utilizes two motors, one for spindle drive; a separate motor for moving table, saddle and knee. Compare this and the other outstanding features of the new Greaves Mill. You'll see why Greaves is "The MOST Mill for the LEAST Money."

- Wide range of speed/feed combinations for any type material, any type job.
- Heavy, internally ribbed column casting and heavy duty rectangular overarm for maximum rigidity.
- Large, heavy-duty knee, saddle and table provide accuracy for all types of milling.
- New 7½ HP spindle drive motor, with separate motor for movable components, provides extra power for heavy milling.
- Easy-to-reach controls. Handwheels and vertical crank disengage automatically when not in use.
- New rapid traverse lever within operating control area.
- Separate drive motor for table, saddle and knee provides more smooth balanced power at the cutter.

Write for detailed literature!

GREAVES
MACHINE TOOL DIVISION

J. A. FAY & EGAN COMPANY
2600 Eastern Avenue, Cincinnati 2, Ohio

Encircle No. 242 on Card, Opposite Page 65

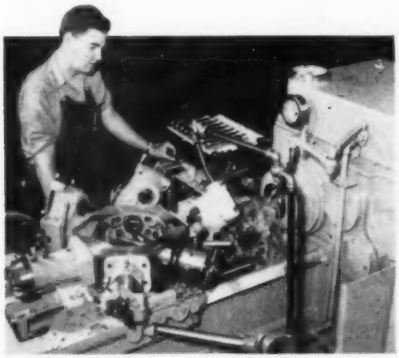
HERE'S REAL BREAD-AND-BUTTER PRODUCTION!



Warner & Swasey 1-A combines power and instantaneous speed changes with standard tooling for top efficiency on this small lot job.

The practical shop man knows that, after all the smoke has cleared about fancy attachments and special tools, most small lot work depends on his real "bread and butter" producer–the versatile, standard-tooled turret lathe.

And here's a typical small lot bar job, a 10-inch pinion shaft, that demonstrates this point. It requires the flexibility of standard tooling, power to really hog metal, and a fast selection of the most efficient cutting speeds. A new Warner & Swasey 1-A Extra Heavy Duty Turret Lathe, equipped with standard tools, does the job in 4½ minutes–*real metal turning efficiency!*



It requires a variety of cuts with 7 speed changes. The 1-A's 16-speed, all-clutch head, with its pre-selector, delivers them instantaneously!

First cut in this high carbon steel is taken with a standard single cutter turner, using a carbide cutter. It is ½-inch deep and consumes 30 horsepower! Second and third turning cuts are also taken with single cutter turners, using mechanically-held carbide tipped, throw-away cutters.

Two speed changes are made during the cutoff operation, again showing the advantage of instantaneous speed changes under cut, without effect on the carbide cutter.

Traditional Warner & Swasey ease of machine handling, enhanced by the new hydraulically-operated collet chuck and bar feed, not only cuts cycle time but cuts operator fatigue–puts more pieces on the floor at the end of each day!

WARNER & SWASEY
Cleveland
PRECISION MACHINERY SINCE 1880

YOU CAN PRODUCE IT BETTER, FASTER, FOR LESS . . . WITH A WARNER & SWASEY

Encircle No. 243 on Card, Opposite Page 65

0A

9" column 3'-4' arms

1A

9"-11" column 3'-4'-5' arms

3A

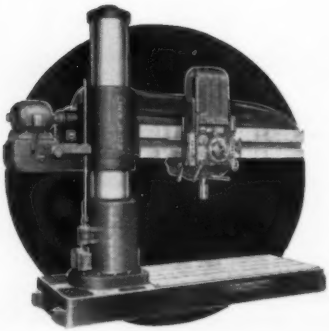
13"-15"-17" column 4'-5'-6'-7' arms

4A

19" column 6'-7'-8' arms

5A

22"-26" column 7' to 12' arms



Only one can be called the finest

Only Carlton offers you a choice of three speed-feed controls:

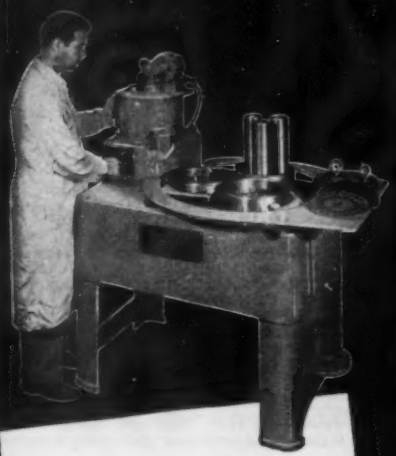
Programming for pre-selecting speeds and feeds for an entire drilling program including as many as 20 or 30 operations. *Pre-selector* for setting speed and feed for the next operation while machine is still under cut. *Manual* to take advantage of Carlton's centralized push button control. For futher information, send today for free descriptive bulletin. The Carlton Machine Tool Co., Cincinnati 25, Ohio.

Carlton

horizontal and radial drills

Encircle No. 244 on Card, Opposite Page 65

Lapping For Precision Flatness and Parallelity in Production Quantities



...with a LAPMASTER

This is the machine for you if you want precision flatness in production quantities at low cost. Lapmasters readily lap to the extreme close tolerance of one light band (.0000116") or less. In addition they produce an extremely fine finish to as low as 1 RMS. They are available with 12", 24", 48", 72" or 84" lapping plates.

THIS IS HOW THE LAPMASTER WORKS

I, a heavy cast iron lap plate revolved slowly under power. **II,** large cast iron conditioning rings are held in position and rotate freely on the lap. **III,** work pieces are placed inside the conditioning ring where they also rotate on the lap. **IV,** a liquid vehicle containing fine loose abrasive flows on the lap plate and is uniformly distributed under the work pieces. At the same time the rotating conditioning rings preserve the flatness of the lap plate. These three essential features, combined with the rapid cutting action of loose abrasive produces a flatness which meets every production requirement.



1 Operator requires no previous lapping experience.



2 Lapping with loose abrasive and without excessive pressure eliminates heat and subsequent distortion.



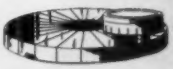
3 Simplicity of design provides accessibility and allows ease of loading and unloading.



4 Loose abrasive distributed evenly over lapping area insured uniform results.



5 Precision laps identical parts in one cycle or parts of various shapes, heights and materials in one cycle.



6 Lap plate always kept in condition while in operation. No down time required for truing or reconditioning.



Learn more about the possibilities of production lapping and the interesting subject of measuring flatness. The illustrated fact-filled booklets are yours for the asking. Write today.

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6412 Oakton St., Morton Grove, Ill., (Chicago Suburb)
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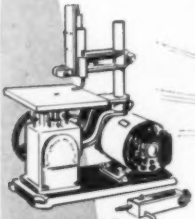
CRANE PACKING COMPANY

35 YEARS INDUSTRIAL PROGRESS

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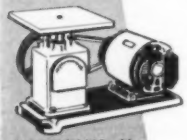
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KELLER Die Filers



DELUXE: Files, Saws, Laps. Has File Roller Support Arm and Overarm.

Standard: With File Roller Support Arm for Maximum Accuracy



ECONOMY: Has no File Roller Support Arm or Overarm.

- **Self Compensating File Chuck**
- **Wide Capacity —1/8" diam. to 1/2"x5/8" Files**
- **Throat Depth—7¼"**
- **Two Speeds—350/450 strokes per minute**
- **Full 1½-inch Stroke**

Saves Time, Saves Money, and Does the Job Better!

Built-for-the-Job Handles all shapes and sizes of files from 1/8" diam. to 1/2" x 5/8". File Roller Support has full 6-inch adjustment for Maximum Accuracy on all jobs.
Large 8½" x 8½" Worktable with plenty of room for clamping guide blocks, etc. Table tilts up to 15-degrees in any direction and is locked by four knurled thumbscrews.
Long, Dependable Service . . . the Scotch Yoke is splash lubricated and equipped with Oilite Bearings throughout.
Plenty of Power—¼ H.P., 1800 rpm motor.
Write for Bulletin 256, and your distributor's name.

SALES SERVICE MACHINE TOOL CO.
2357 University Ave. St. Paul 14, Minn.



ACCESSORIES: Steel Floor Stand, Hinged Belt Guard, and Gooseneck Lamp.

KELLER *Power* Die Filers

Built by the makers of KELLER Power Hack Saws

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MANHATTAN Portable Wheels
Built For Your Job

Type of abrasive, grain size, hardness, structure in rubber or resinoid bond—all are selected after a careful analysis of: your grinding problems, the amount of metal removal, the finish your operations require. The result is that every type of Manhattan Portable Wheel—flared cup, raised hub, cone or plug and mounted points, as well as straight wheels—removes *more* metal, *faster*, and at *lower* cost.

You get more pieces done . . . more output per man hour . . . plus uniform quality production and longer wheel life. It means "More Use per Dollar" for all grinding operations at your plant. Let a Manhattan sales engineer tell you about Manhattan Portable Wheels and other types of high speed, heavy duty abrasive wheels . . . engineered with *your* job in mind.

RM 640-R

WRITE TO ABRASIVE WHEEL DEPARTMENT

MANHATTAN RUBBER DIVISION—PASSAIC, NEW JERSEY

RAYBESTOS-MANHATTAN, INC.

Manufacturers of Mechanical Rubber Products • Rubber Covered Equipment • Radiator Hose
Fan Belts • Brake Linings & Blocks • Clutch Facings • Packings • Asbestos Textiles
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NEW! JOHNSON'S

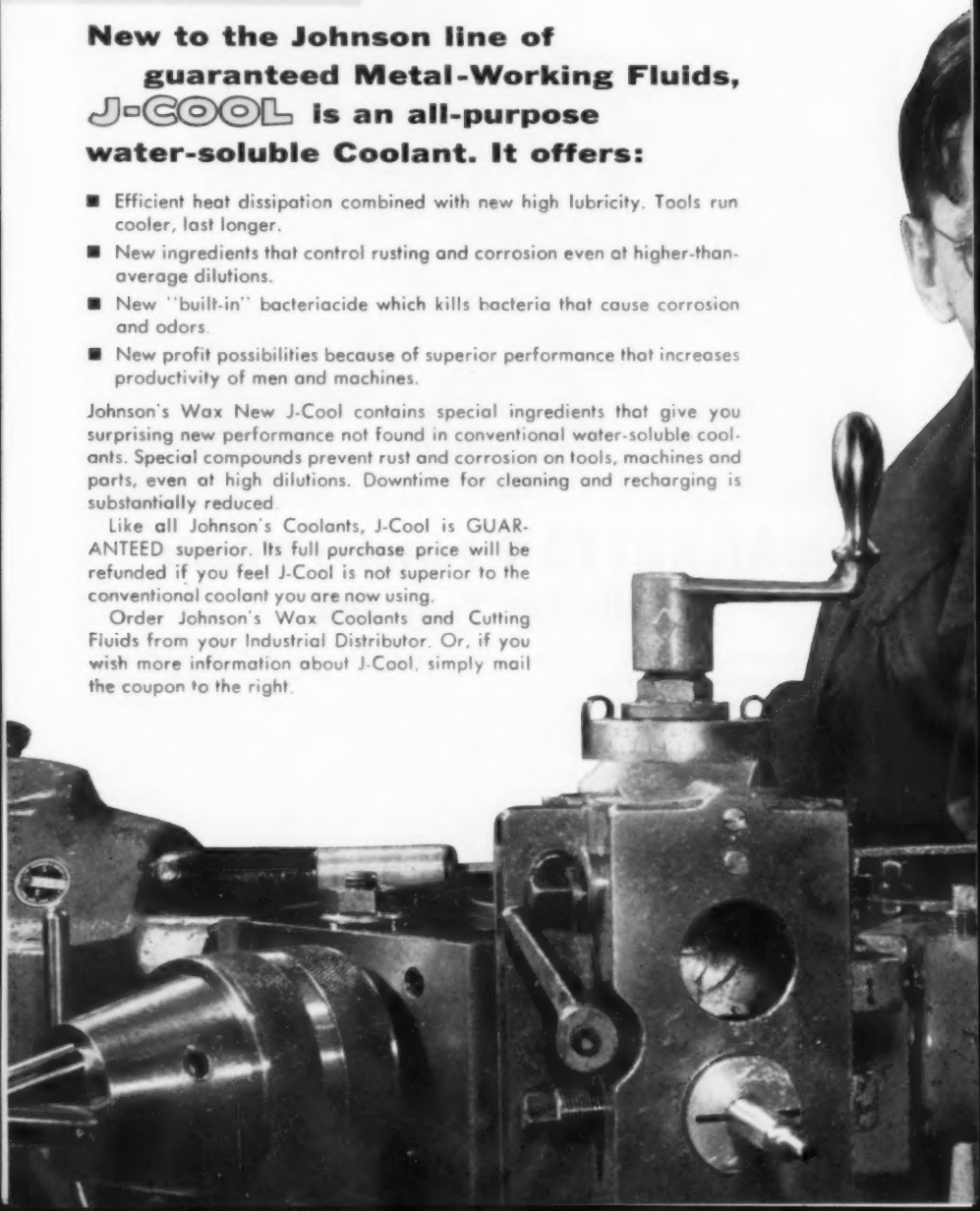
New to the Johnson line of guaranteed Metal-Working Fluids, J-COOL is an all-purpose water-soluble Coolant. It offers:

- Efficient heat dissipation combined with new high lubricity. Tools run cooler, last longer.
- New ingredients that control rusting and corrosion even at higher-than-average dilutions.
- New "built-in" bacteriacide which kills bacteria that cause corrosion and odors.
- New profit possibilities because of superior performance that increases productivity of men and machines.

Johnson's Wax New J-Cool contains special ingredients that give you surprising new performance not found in conventional water-soluble coolants. Special compounds prevent rust and corrosion on tools, machines and parts, even at high dilutions. Downtime for cleaning and recharging is substantially reduced.

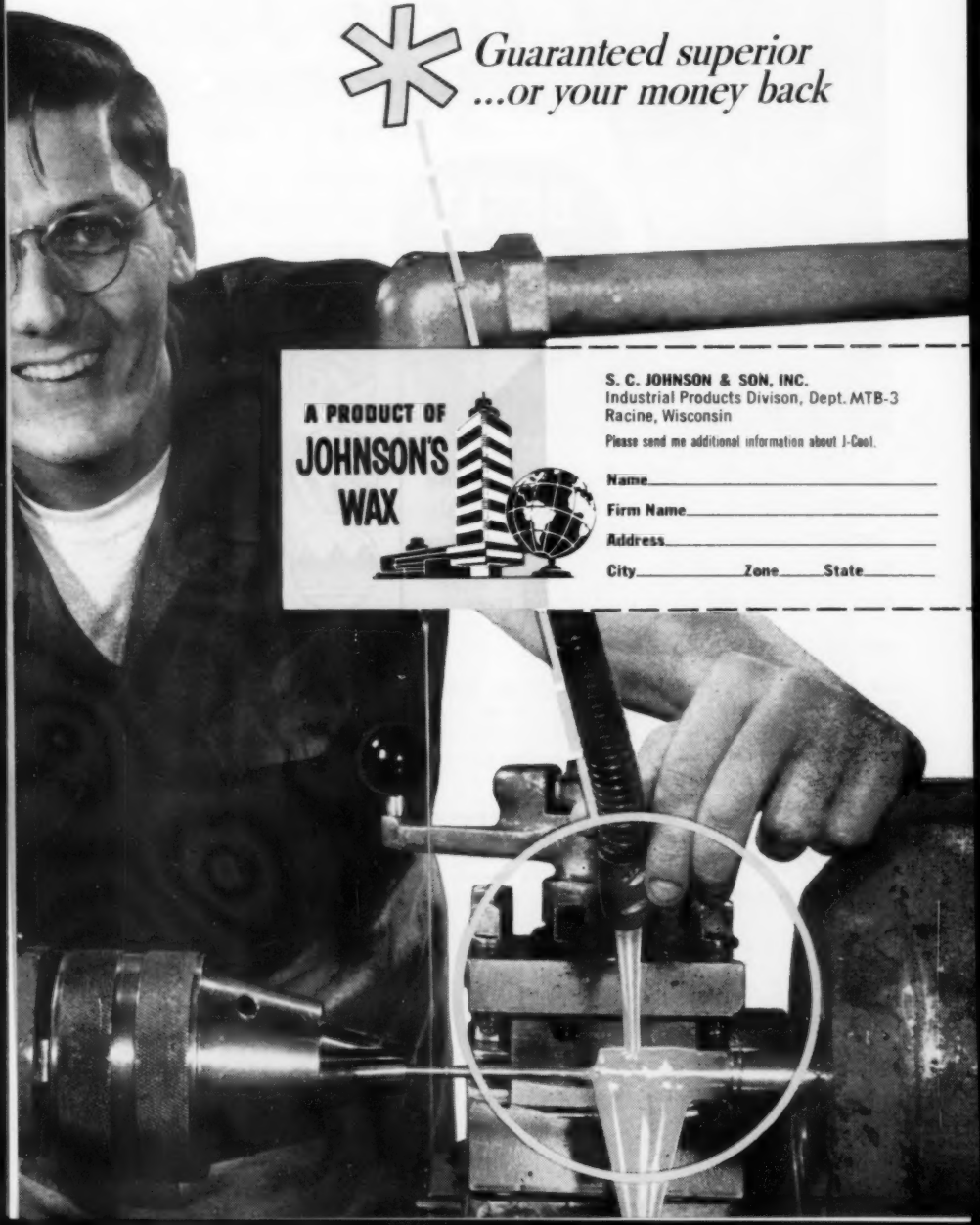
Like all Johnson's Coolants, J-Cool is GUARANTEED superior. Its full purchase price will be refunded if you feel J-Cool is not superior to the conventional coolant you are now using.

Order Johnson's Wax Coolants and Cutting Fluids from your Industrial Distributor. Or, if you wish more information about J-Cool, simply mail the coupon to the right.



WAX J-COOL

Guaranteed superior ...or your money back



A PRODUCT OF JOHNSON'S WAX

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Please send me additional information about J-Cool.

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Doing the Hole Job-

Better, Faster, at Lower Cost

BESLY TAPS

with **UNSURPASSED ACCURACY** *at all vital points*



Tru-Square **DRIVER**



Mirror-Finish **FLUTES**



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Accurate **RAKE ANGLE**



Microcentric **CHAMFER**

You get better threaded parts, longer tap life and lower tapping costs when you use Besly Taps in your shop. The correct tap design plus Besly's unsurpassed accuracy, make the difference, both in production quality and costs.

PUT BESLY ON TRIAL . . .

ask your Besly Distributor to put the right Besly Tap on your toughest job. There's no cost or obligation to actually see what Besly taps can do for you. When you call him, be sure to get the details on Besly's Super-Service on "specials".

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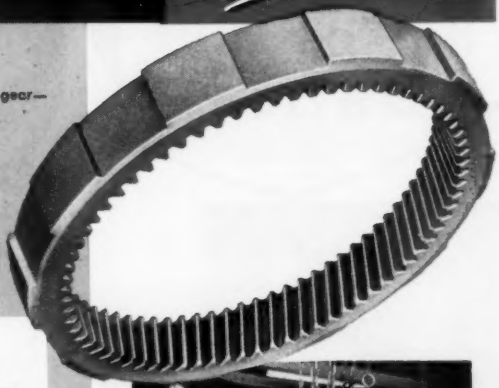
Established as Charles H. Besly & Co. in 1875

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Broach Your Helical Transmission Gears and Cut Your Costs



This is a 73 tooth automatic transmission gear—5.5853 P.D., 14 pitch, 20° pressure angle.

It is broached in just one pass. A single shaving operation completes it.

All critical dimensions including lead and concentricity are held to extremely close tolerances.

Broaching time	25 Seconds, floor to floor
Shaving time	40 Seconds, floor to floor
Total machining time	65 Seconds



The 7 foot Naloy Broach used also chamfers the gear tooth edges as it cuts the teeth.

The constant and intimate contact Red Ring engineers have with advanced gear practice gives them a very real advantage in the design and production of gear tooth broaches.

Write for specific suggestions on your broaching operations.



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WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

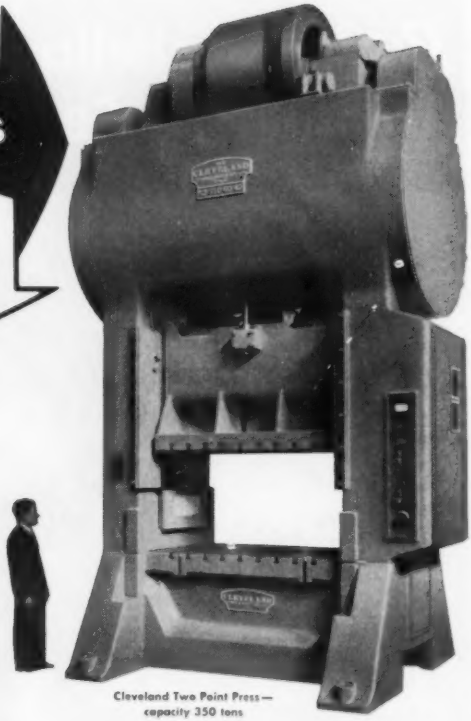
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One Press or a Battery









Cleveland Two Point Press—
capacity 350 tons

planned press replacement cuts your production costs!

In the face of rising labor costs your best solution to increased competition is more efficient production.

New, more efficient presses will cut your stamping costs and turn out a better product. It will pay you to analyze your present press lines. Worn, inefficient presses can be costing you money. Make an operating cost comparison of present vs. new equipment. This will give you a true picture of new press cost.

Won't you let us give you the complete Cleveland story? Our 11 types of modern Cleveland Presses assure stamping economy. Just write or call today.

THE CLEVELAND PUNCH & SHEAR WORKS CO.

Established 1880

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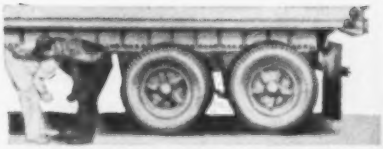
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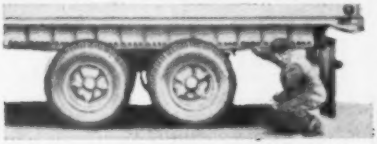
CITY FOUNDRY DIVISION · SMALL TOOL DEPARTMENT

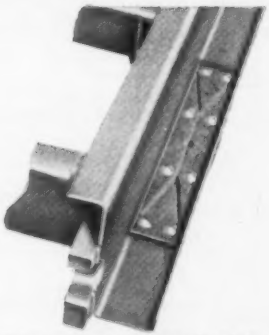
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Wrought Everdur* Cuts Cost in Half



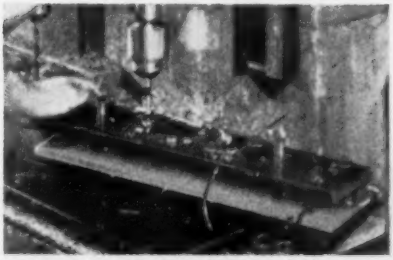
THE TRAILMOBILE SHIFTABLE TANDEM—Truckers often lose time and money in shifting trailer cargo, changing tractors, or cutting payload to meet legal axle-weight requirements. Now, however, they can balance any load in just five minutes by moving the Shiftable Tandem Axle Assembly made by Trailmobile Inc., Cincinnati, Ohio. The axle assembly slides forward or backward, as needed, along a stainless steel rail on four shoes of wrought Everdur. It can move 66 inches and be locked at 3-inch intervals by locking rods through holes in the rail.



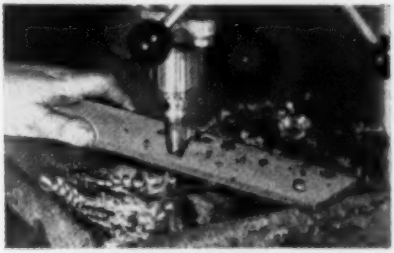


EVERDUR CAN TAKE THE LOADS AND SPLASH—One of the shoes of wrought Everdur installed in the Shiftable Tandem frame. An Alemite fitting in center hole and oil grooves provide lubrication. The Everdur shoes carry normal tandem loads of 32,000 pounds day and night, and slide freely under this pressure. Resistance to corrosion is another reason why Everdur was selected, for unlike the trailer's cargo, the Everdur shoes are exposed to road splash of varied mixtures.

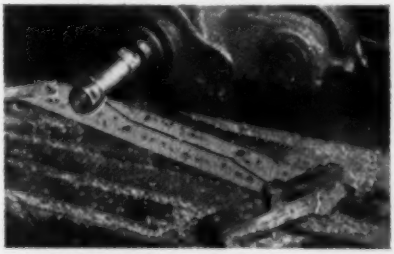
Wherever metal must resist corrosion, be strong and tough, and be available in forms easily fabricated, consider Everdur, Anaconda's family of copper-silicon alloys. The American Brass Company, Waterbury 20, Conn. In Canada: Anaconda American Brass Ltd., New Toronto, Ont. *Reg. U.S. Pat. Off. 3008



HOW WROUGHT EVERDUR CUT MATERIAL COSTS—Trailmobile first tried high-tin bronze castings for the shoes on which the assembly slides. But rejects for porosity and warpage in the thin cast section were a costly problem—and all surfaces had to be finish-machined. The wrought Everdur bar stock suggested by Anaconda's technical experts has surfaces satisfactory as delivered—ready for drilling holes (shown above).



HOW WROUGHT EVERDUR CUT LABOR COSTS—The castings formerly used were not uniform. Hard spots made surface machining difficult and expensive. The entire operation was unnecessary with wrought Everdur bar stock—reducing labor cost by about 50 per cent. (Above) Countersinking holes for screw fastenings.



WROUGHT EVERDUR IS READILY MACHINABLE—Though tough and dense, wrought Everdur is uniform and poses no special problems in machining. Oil grooves are shown being milled in the shoes.

ANACONDA® COPPER-SILICON ALLOYS

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PROTECT METAL TOOLS & PARTS IN SHIPPING, HANDLING OR STORAGE



Thermo-Cote

STRIPPABLE PROTECTIVE COATINGS provide

- **RUST PREVENTION**
- **CUSHION PROTECTION**
- **HERMETIC SEAL**

Crystal clear for instant identification or inspection. Low cost — reusable.

Gov't approval to Spec. JAN C-149.

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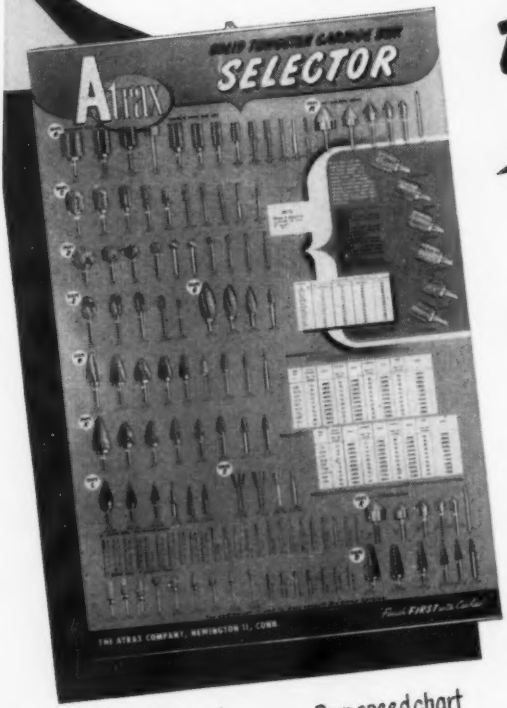
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Made by THREADWELL, Greenfield, Mass.

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SEND FOR THIS
FREE ATRAX SOLID CARBIDE BUR SELECTOR CHART
Today!



127 solid carbide burs shown full size!

Packed with tips for better bur performance!

Shows cuts available: STANDARD-FINE-COARSE-EXTRA COARSE-DIAMOND-CHIP BREAKER!

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Bur speed chart for all materials!

Hang this permanent chart in your plant... solve solid carbide bur problems on the spot. Send now for your free copy.



Atrax

THE ATRAX COMPANY
Newington 11, Conn.

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Meet Willey's Series "A"



two new steel cutting grades join WILLEY'S family of industrial carbides

8-A for roughing cuts

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Specifically designed for machining tough steels, alloy steels and high tensil strength steels, they thoroughly prove their superiority in actual production runs.

Permitting 30% higher feed and speed rates.

Producing Up to 8 times more finished pieces per grind than previous steel cutting carbides.

Increasing Automatic machining operations as high as 146%.

Setting New production records in Automated machining operations.



These two—totally new—**Vacuum Sintered Carbides** have a purity and uniformity in structure that provide a consistent quality not found in previous carbides. The far greater edge strength coupled with exceptional wear qualities and increased cratering resistance offer the users—the best tool performance and—top production results.



TRY—SERIES 8A & 6A, they are available from stock in standard blank sizes. Prompt delivery on pre-formed blanks made to your specifications. Call your Willey's distributor or write:

WILLEY'S CARBIDE TOOL COMPANY
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We Cracked the TIME BARRIER! with DPS MODERN POWER METHODS!



No need for PRODUCTION DRAG on these assembling and feeding jobs!

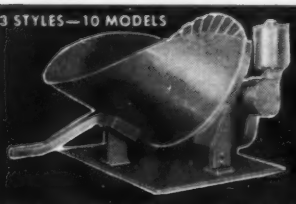
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DPS POWER SCREWDRIVERS and SELECTIVE PARTS FEEDERS

5 MODELS BENCH AND PEDESTAL TYPES

And remember, D.P.S. specially trained engineers are ready to tackle your problem and come up with the right answer.

3 STYLES—10 MODELS



Shown are two products from our expanded up-to-the-minute line. Get the story.

Write for catalog and full details.



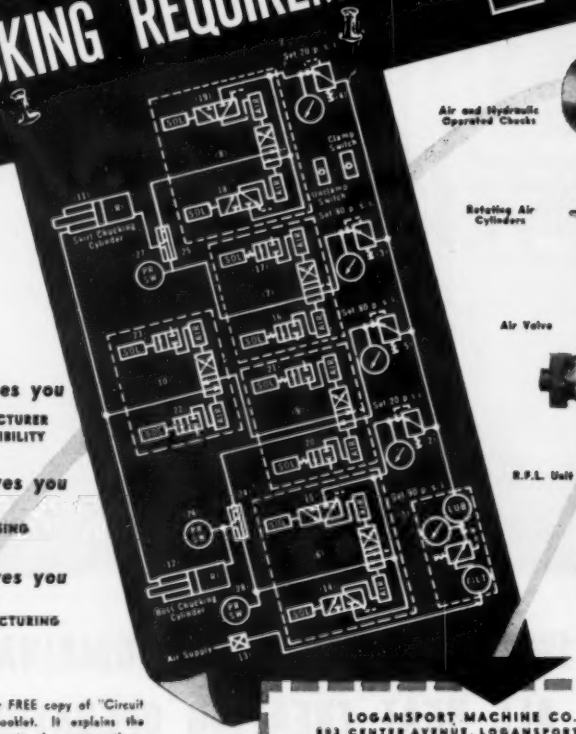
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Industrial Exposition

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For your complete power CHUCKING REQUIREMENTS—specify Logan





Air and Hydraulic Operated Chucks



Rotating Air Cylinders



Air Valve



R.P.L. Unit



Electric-operated Air Valves

Logan gives you
1 MANUFACTURER RESPONSIBILITY

Logan gives you
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Logan gives you
1 SOURCE MANUFACTURING

Write for FREE copy of "Circuit Rider" booklet. It explains the above circuit plus many others.

SAVES TIME — Logan — AIR AND HYDRAULIC EQUIPMENT — EFFORT: MOTION

YOUR DEPENDABLE SINGLE SOURCE FOR ALL AIR AND HYDRAULIC EQUIPMENT

MEMBER
Natl. Mach. Tool Builders' Assn.,
Natl. Fluid Power Assn.

Logan

PROPERLY DESIGNED — PROPERLY EQUIPPED

LOGANSPORT MACHINE CO., INC.
803 CENTER AVENUE, LOGANSPORT, INDIANA

PLEASE SEND COPY OF CATALOG:

- ☐ 100-1 AIR CYLINDERS
- ☐ 100-2 MILL-TYPE AIR CYLS.
- ☐ 100-3 AIR-DRAULIC CYLS.
- ☐ 100-4 AIR VALVES
- ☐ 100-5 LOGANSQUARE CYLINDERS
- ☐ 100-5-1 ULTRAMATION CYLINDERS
- ☐ 51 PRESSES
- ☐ FACTS OF LIFE
- ☐ 42 SURE-FLOW PUMPS
- ☐ 200-1 HYD. POWER UNITS
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- ☐ 200-3 750 SERIES HYD. CYLINDERS
- ☐ 200-4 HYD. VALVES
- ☐ 200-5 FITTINGS
- ☐ 70-1 CHUCKS
- ☐ ABC BOOKLET
- ☐ CIRCUIT RIDER

TO:

NAME _____ TITLE _____

COMPANY _____

ADDRESS _____

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HEVI DUTY TOOL ROOM COMBINATION FOR ALL HEAT TREATING OPERATIONS

This low cost combination consists of the "TEMPERITE" Air Draw Tempering Furnace, maximum temperature 1350° F.; "TREET-ALL" Multi-purpose Furnace, maximum 1850° F.; "SPEED TREET" High Temperature Furnace, maximum 2600° F.; and an "ATMO-GEN" atmosphere generator used to supply a protective atmosphere to the above furnaces. Furnaces and "Atmo-Gen" are available separately. Send for Bulletin HD 1147.

HEVI DUTY ELECTRIC COMPANY

HEAT TREATING FURNACES HEVI DUTY ELECTRIC EXCLUSIVELY

DRY TYPE TRANSFORMERS — CONSTANT CURRENT REGULATORS

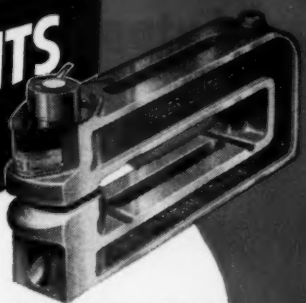
MILWAUKEE 1, WISCONSIN

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WALES hole-punching UNITS

"Boosted our profits, cut time"





"I FOUND THAT OUT; BUT QUICK!"

WALES self contained UNITS are available in infinite sizes and styles . . . from stock

"WALES Engineers showed me how simple the WALES UNIT really is. Punches can be removed and replaced in holders in a jiffy! No special tools needed. No aligning necessary. Little or no 'down time'!

I had a production run of stainless steel flat pieces 24" x 18" (⅛") .125 thick. Called for 14 holes and 2 notches in every piece . . . and they were needed FAST Ordinarily took about three quarters of an hour to set-up and roll.



"The WALES-WAY banished my worries. Punches and dies automatically aligned. Punches, stripping guides, springs and guide buttons are not attached to press ram. They're all components of the WALES UNIT. It's all done in minutes . . . not hours."



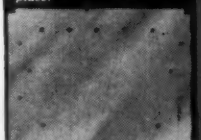
WALES-WAY Punching UNITS are made for a great many uses. One adjustment of the ram for all sizes and forms. The UNITS have a uniform shut height. Punch from skim stock to ¾" plate. Use the same UNITS over and over with different patterns. There's no dead storage of set-ups and no heavy investment. Your shop can really compete in both price and quality . . . and speed.



BL Punching Units and NA Notching Units set in place on Templet.



Punching and Notching Units with work piece in place.



Finished work pieces showing 14 punch holes and 2 notches.

OUR ENGINEERING STAFF WILL ASSIST YOU WITHOUT CHARGE

Tell us about your shop problems in punching, notching, etc. We have case histories galore that should be worth your while to check.

SEND FOR BULLETIN NO. 16

Gives you the complete story of the WALES-WAY Punching UNITS. How they cut costs . . . speed up work . . . increase your profits.



Encircle No. 271 on Card

WALES Strippit CORPORATION

"...the Wales-Way is the PLUS-PROFIT way"

345 PAYNE AVE. — North Tonawanda, N.Y.

WALES-STRIPPIT OF CANADA LTD., HAMILTON, ONT.

Automation in Stamping Production Illustrated on the U.S. MULTI-SLIDE®



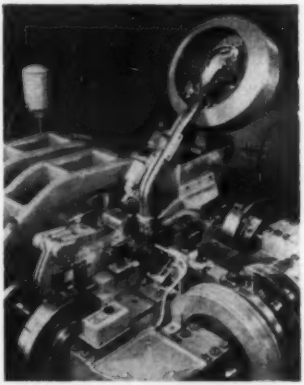
One of the aims of Automation should be the elimination, wherever possible, of secondary operations and handlings. You, like all manufacturers, are interested in attaining this result. The U. S. Multi-Slide can be the answer in the production of stampings.

The sequence-of-operations strip pictured above shows how a complete assembly is produced on the U. S. Multi-Slide without secondary operations. The finished assembly is an automotive fastener comprised of a sheet metal stamping and a nut. The stamping is produced on the U. S. Multi-Slide and the prefabricated nut is hopper-fed into proper position for automatic assembly. The complete unit is produced at the rate of 100 per minute – without handling.

The elimination of secondary operations results in reduced cost per piece, an all-important factor in today's competitive market. If you produce stampings and are interested in low piece part costs, why not investigate the use of U. S. Multi-Slide Machines?

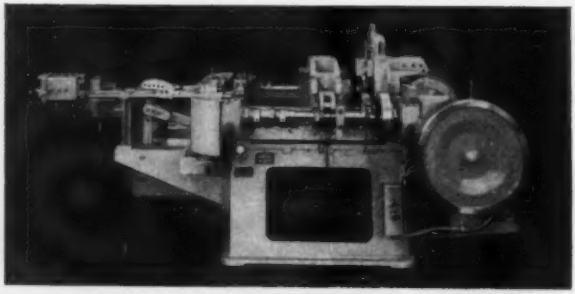
Ask for Bulletin 15-B giving complete specifications

Below: Hopper feed unit mounted on U. S. Multi-Slide Machine for hoppering the nuts into position for assembly.



U.S. TOOL COMPANY, Inc.

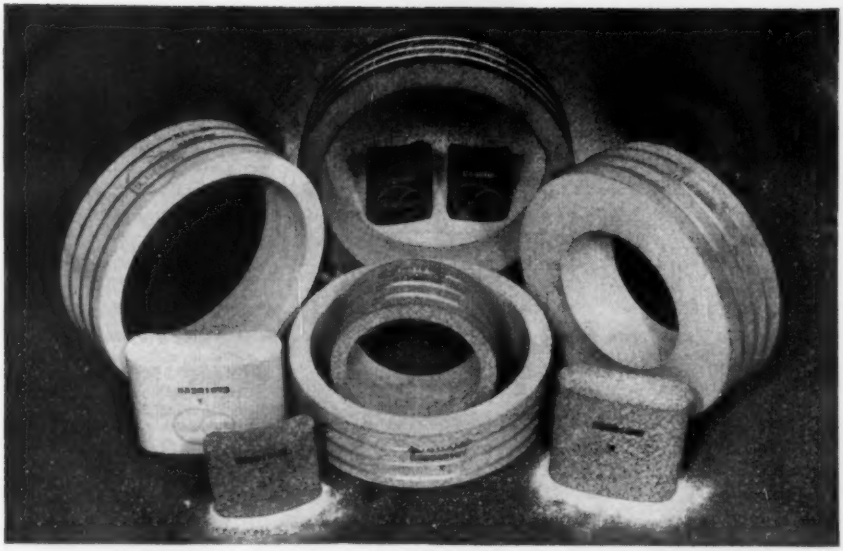
AMPERE (East Orange) NEW JERSEY



Builders of U.S. Multi-Slides
U.S. Multi-Millers
U.S. Automatic Press Room Equipment
U.S. Die Sets and Accessories

Left: Standard No. 33 U. S. Multi-Slide Machine on which the hopper feed unit is installed.

Encircle No. 272 on Card, Opposite Page 65





Here's why Blanchard Wheels are best for Blanchard grinding

Almost thirty years ago, Blanchard began developing and manufacturing better grinding wheels for Blanchard Surface Grinders. Our research first produced silicate bonded wheels, and then resinoid bonded wheels.

Today, Blanchard offers silicate, resinoid and vitrified bonded wheels . . . scientifically manufactured and accurately graded in our modern wheel plant.

Use Blanchard Wheels on your Blanchard Grinders. The correct wheel gives you peak production and economy on each job . . . whether the work is tough as copper or fragile as glass, whether it requires heavy roughing cuts or precision grinding within .000010" of absolute flatness and surface finish of 1 micro-inch.

PUT IT ON THE BLANCHARD

THE BLANCHARD MACHINE COMPANY 64 STATE ST., CAMBRIDGE 39, MASS., U. S. A.

THE BLANCHARD MACHINE COMPANY 64 State St., Cambridge 39, Mass. MTB

Please send "The Art of Blanchard Surface Grinding" (3rd Ed.)

NAME_____ STREET_____

FIRM_____ CITY_____ ZONE____ STATE_____

Encircle No. 273 on Card, Opposite Page 65

Cooley

ELECTRIC HEAT TREATING FURNACES

35 Models

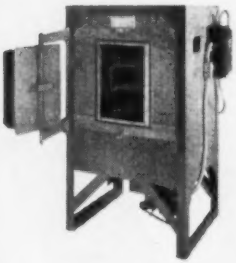
WITH AND WITHOUT

Controlled Atmosphere

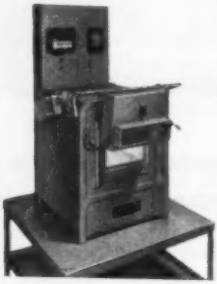
ELECTRIC OVENS



New GA batch type controlled atmosphere furnace designed for tool rooms and small production. 2 models now ready—others to follow.



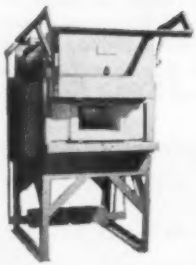
Recirculating Air Draw: box type furnace for controlled heating to 1300° F.—steel tempering, glass annealing, etc. 8 sizes to 24″ w. x 15″ h. x 48″ d.



Bench Type: for tools and small parts—to 2000° F. 14 sizes to 10″ w. x 8″ h. x 18″ d.

Recirculating Ovens: for drying, finishing and industrial processing to 600° F. 5 sizes to 36″ w. x 36″ d. x 60″ h.





High Temperature Box Furnace: for high speed steel treating to 2500° F. 3 sizes to 12″ w. x 8″ h. x 24″ d.

Industrial Box Furnace for general heat treating—to 2000° F. 8 sizes to 24″ w. x 18″ h. x 48″ d.



Catalog and complete information on any of these furnaces will be gladly furnished on request.

COOLEY ELECTRIC MANUFACTURING CORPORATION

36 S. SHELBY ST. • INDIANAPOLIS 7, INDIANA

Encircle No. 274 on Card, Opposite Page 65



Controlled compressed air has given Industry muscle-saving power to produce more, economically, without fatigue, more safely.

Wherever *you* actually use compressed air—you'll make its use more effective if you use the best valves possible—Schrader Valves.

In the complete line of Schrader Valves you'll find two-, three- and four-way models . . . for hand, foot, cam, pilot or solenoid operation . . . for practically any application.

Find out how Schrader Valves can put compressed air to work to save you money. Write—or, if you prefer, fill out the coupon below.

Schrader

LEADERS IN AIR CONTROL SINCE 1844



The complete Schrader line of pneumatic accessories includes everything you need

A. Schrader's Son
Div. of Scovill Manufacturing Company, Incorporated
466 Vanderbilt Ave., Brooklyn 38, N.Y., Dept. 1-3.

I am interested in more information on_____

Name_____ Title_____

Company_____

Address_____

Encircle No. 275 on Card, Opposite Page 65

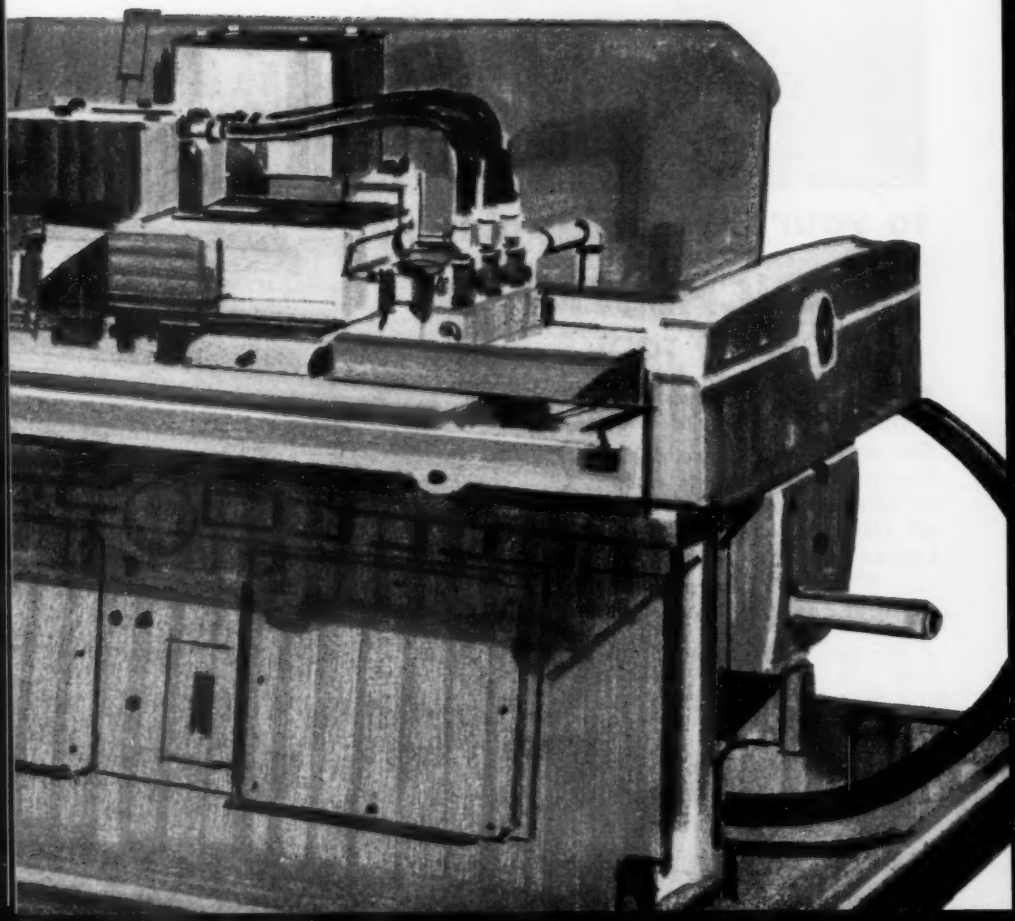

GISHOLT
SIMPL

GISHOLT MASTERLINE SIMPLIMATIC AUTOMATIC LATHE

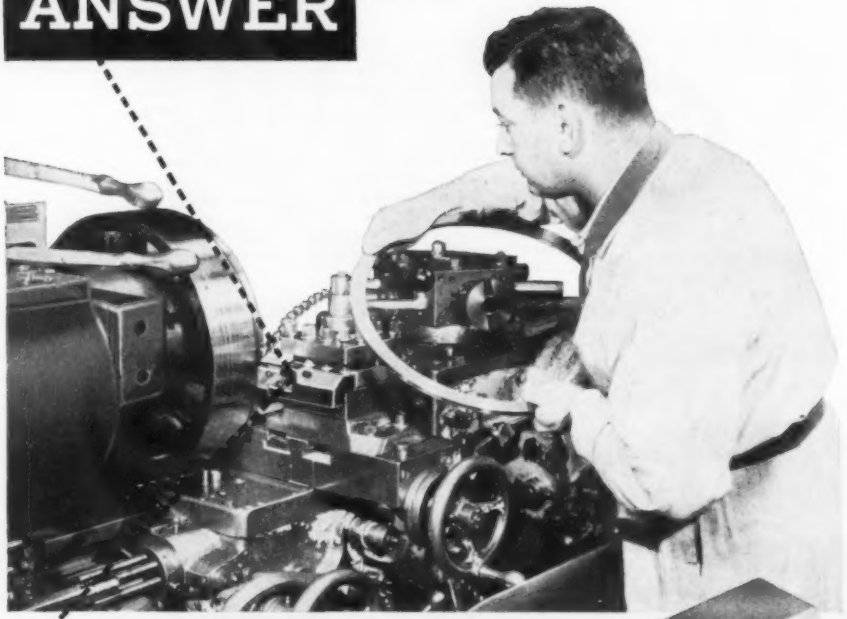
This is the latest design of the Gisholt MASTERLINE Simplimatic. There are many important improvements and outstanding features. Operation is faster. Setup and change-over are quicker. Maintenance is lower. In short, here is an advanced design for better work at lower cost—and with new minimum requirements for operator skill, attention and effort. Let us tell you more about these improved machines—and how they may be applied profitably to your manufacturing processes.

Gisholt Machine Company, Madison 10, Wisconsin

Look ahead—keep ahead—with Gisholt



ANSWER



to your CUT-OFF problems

MANCHESTER
CUT-OFF TOOL



- **change in 15 seconds**
- **eliminate machine down-time**

Get maximum production . . . practically no machine down-time . . . on turret lathes, engine lathes, automatics and cut-off machines with PDQ Manchester Cut-Off Tool. Loosen only one screw to change carbide insert . . . "V"-design assures accurate self-centering. Get a faster cut-off with Manchester and save money!

See the Manchester Cut-Off Tool in Booth No. 669 at the ASTE Industrial Exposition—March 19 to 23 — Chicago International Amphitheatre.

Write for literature today!

PORTAGE DOUBLE-QUICK TOOL CO.

1037 Sweitzer Avenue **Akron 11, Ohio**

Encircle No. 277 on Card, Opposite Page 65

Featured | IN THIS ISSUE

An Interview With James D. Greensward **97**

Engineering for You and Me **105**

Powdered Metallurgy Can Save You Time and Money **121**

1956 ASTE Tool Show Will Be Largest Ever Held **147**

Capital Roundup, by Arnold Kruckman, Blue Book Washington correspondent. Mr. Kruckman reports on the recent National Tool and Die Manufacturers Association meeting in Florida at which N. A. Olsen, acting director, Metalworking Division of BDSA, outlined the Federal Government's problems in the machine tool business. **Page** **89**

Interview with James D. Greensward, vice-president and director of manufacturing, Allis-Chalmers Mfg. Co., Milwaukee, Wis. This month's "Leaders of Thought in Industry" interviewee discusses special machines in manufacturing and the general production picture at Allis-Chalmers. **Page** **97**

Engineering for You and Me, Part 2, Strength, Fatigue, Failure in Fasteners, by Harry Conn, chief engineer, Scully-Jones & Co., Chicago. Mr. Conn's second article in this series reviews many of the basic engineering principles of stress, strength and fatigue in fasteners. **Page 105**

Powdered Metallurgy Can Save You Time and Money, by Samuel Bradbury, III, and George Karian of the F. J. Stokes Machine Co., Philadelphia. This is the conclusion of a two-part series dealing with application, processes and advantages of powdered metallurgy in the manufacture of specialized products. Page **121**

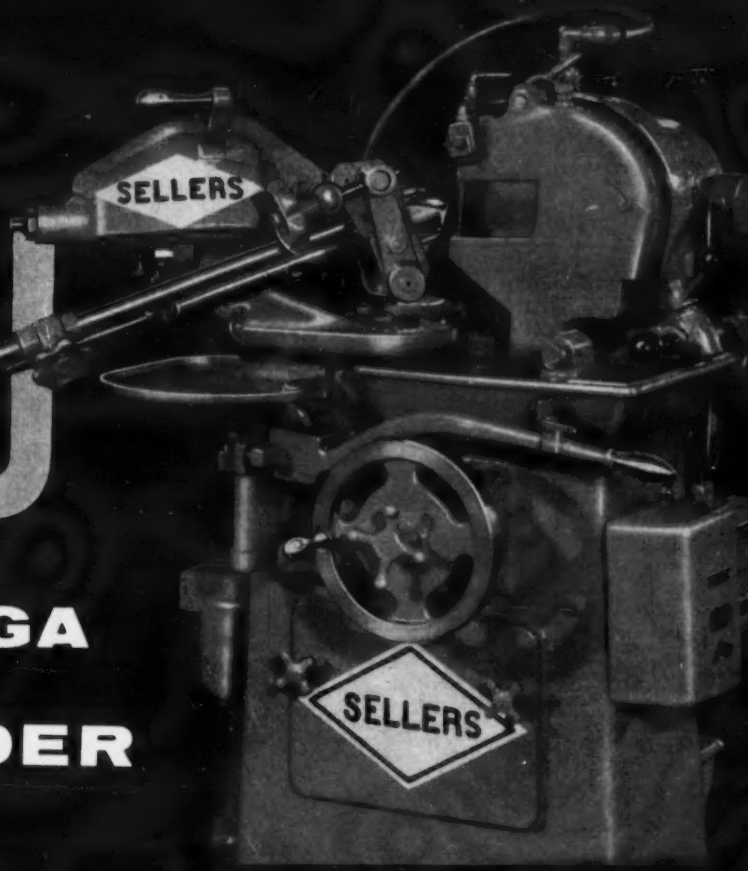
1956 ASTE Tool Show Will be Largest Ever Held. Organizers of the 1956 Industrial Exposition report a record-breaking demand for exhibit space. This section includes a listing of the more than 450 exhibitors at the show and some of the products to be shown; a program of conferences; and plant inspection visits. **Page** **147**

THE

new

SELLERS 6-GA

DRILL GRINDER





Grinds faster and handles easier. And it can also be arranged to grind carbide drills.

Capacity: 5/16" to 3" drills

CONSOLIDATED MACHINE TOOL CO.

ROCHESTER, NEW YORK

A DIVISION OF FARREL-BIRMINGHAM CO., INC.

Cincinnati Bickford MEETS ALL REQUIREMENTS AT Canadian Pratt & Whitney Aircraft Company LIMITED



Drilling, Core Drilling and Reaming Alloy Steel Cheek and Counterweights of Aircraft Engine Crankshafts. Reamed holes are held accurate within .0005". Second machine is boring and facing Inlet and Exhaust Ports on Cast Aluminum Cylinder Heads.



Drilling, Counterboring, Reaming and Tapping 1¾" Hole in Aluminum Crankcase Forging Section to a tolerance of ±.001".

Six Cincinnati Bickford 9" column Super Service Radial Drills have given a fine performance and established a record for accuracy and reliability, and have met production problems at Canadian Pratt & Whitney Aircraft Co., Ltd. Modern Cincinnati Bickford features for convenient easy handling, power and speed have made these machines highly profitable. Investigate these money makers.

Write for Bulletin R 21C.

Photos courtesy of Canadian Pratt & Whitney Aircraft Co., Ltd., Montreal, Canada.

CINCINNATI BICKFORD

RADIAL AND UPRIGHT DRILLING MACHINES

CINCINNATI BICKFORD DIVISION

Cincinnati 9, Ohio, U.S.A.

GIDDINGS & LEWIS MACHINE TOOL CO. : Fond Du Lac, Wisconsin

Encircle No. 279 on Card, Opposite Page 65

AS THE Editor SEES IT

An ASTE Show Each Month?

THESE trade shows are wonderful affairs. They bring buyers and sellers together, technical information is exchanged, goods and monies change hands, and as a result of these shows many shops have an easier time with their production and their costs. Furthermore, it's a pleasant sort of vacation for everyone except the exhibitors!

Indeed, we have no fault to find with trade shows.

But no one wants to have one every month, least of all the sponsors.

Yet, did you ever stop to think that America's technical press presents a show every month of the year? The technical press mirrors America's March of Progress week by week, month by month. While they are not solely responsible for the success of trade shows, they contribute mightily to disseminating information about exhibitors, products and sponsors. It is not happenstance that the growth of technical magazines parallels America's industrial expansion.

The metalworking magazines keep you advised of more new products, more technological developments, more news . . . show you the goods of more manufacturers and give you more ideas for cutting costs and increasing production than any single show or exhibition. And you don't have to stir out of your office to be either entertained or instructed.

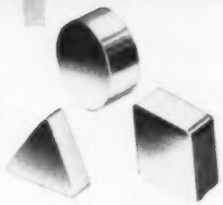
Let's take one publication, the BLUE BOOK. Each month you are exposed to almost 500 different products, some never before discussed in print—and not to be seen at a show until years hence—from almost 500 different manufacturers. There are no laws determining the type of products mentioned in each issue: everything from hand tappers to transfer machines; from layout fluids to die sinkers; from cleaning papers to stamping presses. They're all there, in each issue. There is no admission charge. You need not contend with tired feet, hotel or travel problems. You merely sit back in your chair, open the magazine and you're at your private show. If you want information, scribble your name on the Reader's Service Card, relax, and the information, in mysterious and devious ways, after passing through many conscientious hands, arrives on your desk. And it didn't even cost you a three cent stamp.

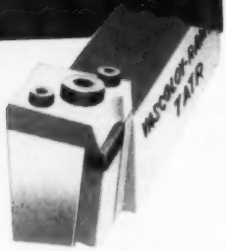
Yes, there's much to be said for America's technical press.

Wm. J. Schleicher

V-R Throw-Away Inserts eliminate your carbide grinding

Each cutting edge costs only pennies!

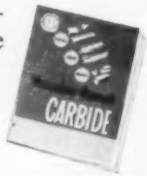




When you use V-R Throw-Away Carbide Inserts in V-R Toolholders you never have to grind the carbide. As many as six to eight cutting edges per insert are immediately ready for use . . . as one cutting edge dulls, index to another . . . after all cutting edges are dull, throw-away and replace with a *new* V-R insert.

Using V-R Toolholders and V-R Throw-Away Carbide Inserts eliminate the necessity of carbide grinding equipment in your plant.

V-R Throw-Away Carbide Inserts are available in standard grades to meet your individual needs. Write today for your V-R Carbide Catalog for all the facts on V-R Carbide products.



VISIT V-R in BOOTH 1137 at the 1956 ASTE Industrial Exposition, International Amphitheater, Chicago, March 19-23.

Get the Cost-Cutting Edges from the V-R man. Call your local V-R distributor or representative.



MANUFACTURERS OF CEMENTED CARBIDES AND TANTUNG CAST ALLOYS . . . TOOLS . . . BLANKS . . . TOOLHOLDERS . . . INSERTS . . . DIES

Vascoloy-Ramet Corporation

SUBSIDIARY OF FANSTEEL METALLURGICAL CORPORATION

850 S. Market St., Waukegan, Illinois

V-R and TANTUNG are registered trademarks of Vascoloy-Ramet Corporation.

Encircle No. 280 on Card, Opposite Page 65

Yours very truly,

Information, Please

Sometime ago we bought some Intoco lathe centers, since that time we have lost or misplaced the literature on these centers.

I would appreciate it very much if you would furnish me with the manufacturers name and address of this center.

Ivan Hand, Machine Shop Foreman
Iowa Mfg. Co.

Can you advise of names and addresses of one or more companies who manufacture test bars for the performance of analytical inspection of machine tools similar to G. Schlesinger.

A. Dekom, Asst. Plant Mgr.
Harvey Aluminum Sales, Inc.

Because of your experience in the machine field, we would appreciate your suggestions concerning the problem we have of finding a source to supply us with *internal* Cam Ground Rings with an outside diameter of 3½ inches.

These rings are made using alloy steel castings or alloy steel tubing.

Burton Grenrock, Pur. Agent
Lift Parts Mfg., Inc.

I have been advised by a machinery company that you are in a position to give special information out regarding lathes and stamping equipment.

We are interested in securing a press that will press anywhere from 15 to 20 ton. We would like a press that has a six or seven inch stroke. Any information, or magazines, which you can send us that will give us this information will be greatly appreciated.

R. R. Schultz
R. R. Schultz Co., Inc.

Any help you can give readers Hand, Dekom, Grenrock and Schultz, will be greatly appreciated.

Machine & Tool Directory

We have received your 1956 edition of your Directory and in our estimation it is very clear and a good source of information.

If possible, we would appreciate an additional copy to give to our engineering department.

E. A. Kelley, Sr. Procurement Director
Remington Rand

. . . We like very much the way the Directory is divided with the especially handy pushout tabs. This type of directory is indeed an aid in our line of work.

H. L. Martin, Pur. Agent
The Perry-Fay Co.

May I take this opportunity to express my sincere pleasure and appreciation to your organization for again sending a Machine and Tool Directory to my office. Your thoughtfulness in sending this handy Annual Directory is indeed valued.

E. H. Smalley, Mgr.
Kaiser Aircraft & Electronics Corp.

Once again, we are very much obliged to you for including us among those to receive Hitchcock's Machine & Tool Directory. That it is consulted many times during the course of the year, you may be very sure.

J. G. Hern, Asst. to Purchasing Agent
Sub-Contract Div.
International Business Machines Corp.

I recently received the 1956 edition of your Machine and Tool Directory. I have found that the indexes are very useful in locating vendors from a very comprehensive list of suppliers of equipment and supplies in which I have a daily interest.

J. H. Flather, Works Eng.—Factories
Linde Air Products Co.

. . . We feel that this is one of the most complete Directories of its type we have ever seen and expect to obtain a great deal of benefit from the use of it.

A. O. Bruestle
The Cincinnati Mine Machinery Co.

Thank you very much for your Machine and Tool Directory which I received this week. It is a very helpful book, and has saved me many hours during the past as I refer to it constantly in my work.

H. T. Beebe, Methods Eng.
United Mfg. Co., Div.
The W. L. Maxson Corp.

. . . Please be advised that this little, but very compact book will be very useful since it contains information pertinent to our operations.

W. F. Call, Gen. Supt.—Plant Eng.
Chevrolet - Cleveland Div.
General Motors Corp.

Brazing

Please send me a reprint of the following article which appeared in the September 1953 issue of "Machine and Tool Blue Book" pages 174-182, "Brazing of Cemented Carbide Tools and Parts"—F. J. Lennon, Jr.

Louie Boer, Tool Designer
Criterion Machine Works

Selecting the Proper SFPM

I would appreciate receiving tear sheets of the article "How to Select the Proper SFPM in Milling Operations" if they are available at this time.

Max P. Mohorick, Tool Designer
Brainard Steel Corp.

Tear sheets sent.

Broaching Machines

You reprinted the above subject special report from the April, 1951, issue of the "Machine and Tool Blue Book."

We are most anxious to know whether or not you still have some of these reprints available.

We would appreciate your sending us 6 copies if it is at all possible.

Dick Geyer
Jack Dustman & Associates

Our supply of reprints of all the special reports has been completely exhausted for some time, but these can still be obtained in Volumes 1 and 2 of "American Built Machine Tools," which combine all of these reports. The two volumes are available at $7.50 from Hitchcock Publishing Co., Wheaton, Ill.

Time Study

Please rush to me Time Study booklet for which I am enclosing $1.00 for cost. Also send me list and prices of other books which you have that may be useful to me.

George Surma

I am writing in reference to the Time Study booklet written by Mr. H. R. Nissley. All I can say is please put me on the list for two copies.

John W. Bedford, Time Study Eng.
National - U.S. Radiator Corp.

. . . I am enclosing a check for a personal order for three copies. These articles have proven both useful and interesting to me and am looking forward to receiving the booklets. I will also make this opportunity known to the balance of our Manufacturing Engineering Dept.

Victor Coppola, Ind. Eng.
Quiet Heet Mfg. Corp.

We are snowed under with requests for the Time Study booklets. All orders are being sent as soon as possible.

Only Kearney & Trecker has Twin Screw Knee Support



Available under Tool-Lease program

New TF Series machines give you equal distribution of all work loads . . . unmatched rigidity under heavy cuts

Kearney & Trecker's new line of TF Series Plain, Universal and Vertical milling machines gives you more outstanding design and operating features than any other knee type milling machines on the market today.

Among these features is the *exclusive* TWIN SCREW KNEE SUPPORT. This *double support* arrangement substantially increases stability under the heaviest loads . . . offers greater resistance to torsional thrust under all cuts . . . divides the wear factor in half thus assuring greater, longer-lasting accuracy.

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CAPITAL ROUNDUP . . .

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Capital Roundup

Greater Uses of Automation Expected From Tool and Die Shops

by **Arnold Kruckman**
Blue Book Washington Correspondent

N. A. Olsen, Acting Director, Metalworking Equipment Division of BDSA, Department of Commerce, told officials of the National Tool and Die Manufacturers Association at their January meeting in Florida the story about what the Federal Government thinks it and the industry should do about its various problems.

Director Olsen pointed out our nation is enjoying a period of unprecedented prosperity but this doesn't necessarily mean that Tool and Die Companies are all enjoying the full fruits of this prosperity.

Since the March, 1955 Tool and Die Industry conference, Olsen feels a major industrial story has been told which should be of great interest to contract tool and die companies. This is the subject of automation, reviewed recently by Congress. Tool and die companies have made vital contributions to mechanization—making of machines to do man's work. As a part of this current industrial revolution there will be an increase in activities toward automation in most segments of industry, and tool and die shops will participate to an even greater extent. The Metalworking Equipment Division has assembled extensive data concerning automation and is following developments closely. Accumulating data on advances in metalworking and automation is important to BDSA. Mr. Olsen is considering adding to the metalworking equipment staff—as a part time

- *increased use of automation predicted*
- *BDSA conducting tool & die survey*
- *labor contracts blamed for skilled labor shortage*
- *reserve machine tool program adopted by Department of Defense*
- *machine tool trigger contract problems reported solved*

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Large Machine Business

Recognizing the trend toward very large machine tools, extrusion presses and close die forging presses, Government is very much concerned that tool and die builders give adequate consideration to the growing large-machine business, Olsen states.

Government recognizes the tool and die industry as a very important contributor to all defense efforts, says Mr. Olsen. But Government knowledge about the location and capabilities of many contract tool and die shops is lacking. The Metalworking Equipment Division needs this information to supplement a defense production program for national security. To obtain this data, the Division is presently conducting a survey of all known Contract Tool and Die establishments. The questionnaire already mailed to each individual shop requests information on the value of shipments for the calendar year 1955 and an indication of the types of products the shop manufactured during that period, or is equipped to manufacture with present facilities. The generous cooperation and assistance of the National Tool and Die Manufacturers Association in addressing these questionnaires not only to its member companies but to all known Tool and Die Shops in the country has saved the Government both time and money. On the basis of this preliminary basic survey the Metalworking Equipment Division will request from a smaller segment of the industry additional information about shop capacity at some future date.

Labor Shortage

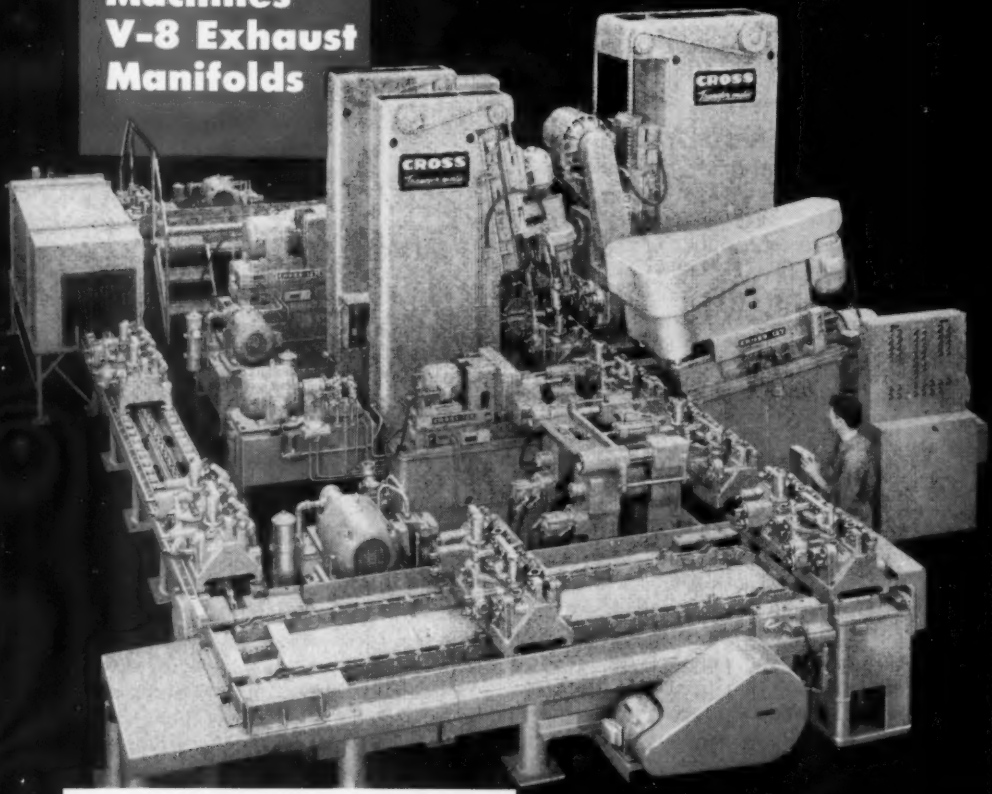
At the Industry Conference last March, attention was focused on the skilled labor shortage and on apprentice training programs. It was agreed that the key to defense production in the tool and die industry lies not primarily in machines and material, but in skilled help. An estimate was given which predicted that in twenty-five years, the industry would have only one-third the present number of skilled workers, if the training rate of new men continued at its present level. Labor contracts limiting the ratio of apprentices to skilled workers were blamed as the primary reason behind the growing shortage. This is denied by the Bureau of Apprenticeship of the Department of Labor, which says that industry isn't taking advantage of the present established ratio. A conference of the National Machine Tool Builders Association, the National Tool and Die Manufacturers Association, and Depart-



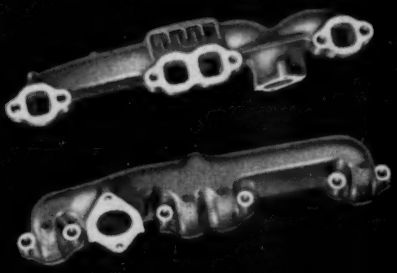
"Now that the show is over we can bickle, backle, buckle down to our work with form, flim, firm eyes and sleddy, shoddy, steady hands!"

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ment of Labor representatives tentatively planned for February 20th will discuss these problems.

Reserve Tool Program

During January the Office of Defense Mobilization and the Department of Defense announced their joint policy on the Reserve Tool and Facilities Program. The policy was formulated to permit procurement of long lead-time machine tools, to prevent obsolescence and to achieve flexibility in the use of reserve tools, and will become effective immediately.

Reserve machine tools will be maintained in two ways—(1) in groups or "packages" owned by the individual military departments and designated to produce certain items in the event of mobilization, and (2) as individual tools in a central Defense Department inventory, available for use by all branches. All "packaged" tools will be reviewed annually to determine whether the packages are essential or not, and whether replacements or additions are needed. Tools not needed in packages will be placed in the central inventory, available to any military department for current use.

Military Departments will be allowed to use equipment in packages on a loan basis when such equipment is not available from industry or from inventory to meet urgent production schedules. When replacements are received, borrowed equipment will be returned to its original package. Each Military Department is to budget for its own tools, including those needed for current programs, mobilization reserves and replacement.

ODM and the Department of Defense stated that policy changes were adopted to meet changing current military and mobilization reserve requirements; to insure availability of up-to-date tools; to get full benefit from newly developed, more efficient equipment and techniques; to insure training of personnel to operate the newer type equipment; and, to provide a more realistic basis for reviewing the requirements of the Military Department for machine tools and to tie them in to firm programs and regular annual budget cycles.

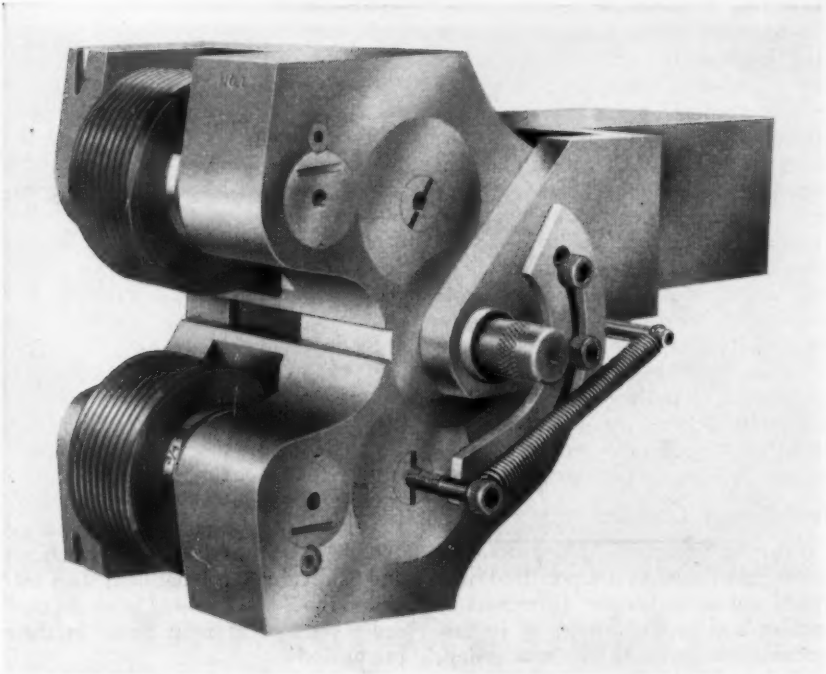
$100 Million Allocated

For fiscal 1955 and again for fiscal 1956, Congress appropriated $100 million to be allocated by the Secretary of Defense for the purchase of long lead-time machine tools to be placed in the mobilization reserve and not used for current production. Out of the 1955 appropriation, $16 million has been approved for the purchase of tools for the reserve. Of this total, $1 million was used by the Army and $15 million by the Navy. The remaining $84 million is being returned to the Treasury by the Air Force as unobligated; however, substantially the same amount and types of tools will be procured from production funds by the Air Force and will be placed in current production. The balance of the $100 million appropriated for fiscal year 1956 is held in abeyance pending final plans for its use.

Mobilization Hearings

Committee hearings on mobilization plans for the machine tool industry were announced jointly by Senator John Sparkman, Chairman, and Senator Edward J. Thye, Chairman of the Committee's Subcommittee on Relations of Business with Government. The hearings are scheduled during February.

Senator Thye stated: "Since so large



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a proportion of the firms in the machine tool industry are small, the Senate Small Business Committee has taken a continuing interest in the industry and its problems, and, in addition, the impact of shortages of critically needed tools in periods of emergency inevitably bears most heavily upon smaller manufacturing establishments. In 1952, our Committee held comprehensive hearings on the post-Korean machine-tool shortage and concluded in its report to the Senate that the lack of sound Government planning and policies had contributed to numerous delays in the production of war goods. We want to be sure that we are now better prepared to meet any future emergency."

Tool Trigger Contracts

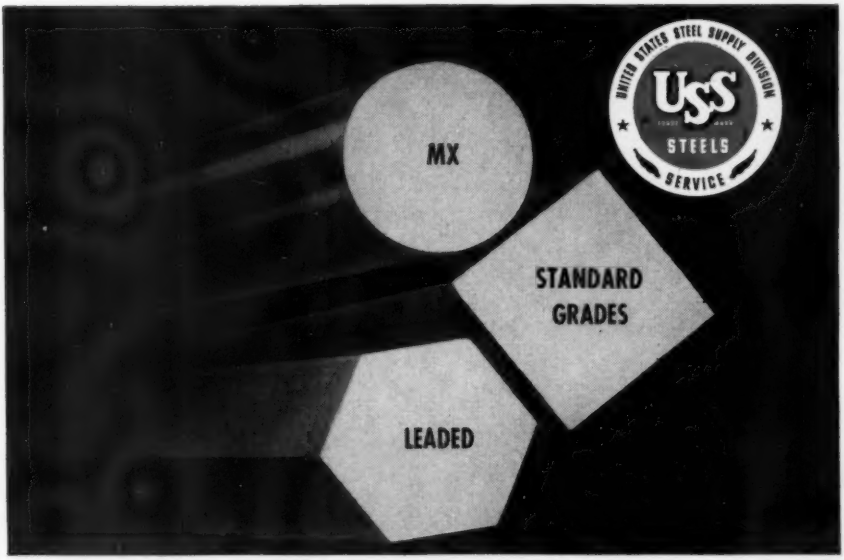
The task group on M-Day machine tool trigger contracts is reported to have ironed out all important differences of opinion and inconsistencies at its last meeting late in 1955. The task group, headed by N. A. Olsen, Acting Director, Metalworking Equipment Division, BDSA, consists of Swan E. Bergstrom, Cincinnati Milling Machine Co.; Everett N. Hicks, Norton Co., Worcester, Mass.; Rudolph F. Bannow, Bridgeport (Conn.) Machines, Inc.; Russell F. Hall, Wysong & Miles Co., Greensboro, N.C.

Mr. Olsen reported that the Metalworking Equipment Division has virtually completed the task of selecting the participating builders, and in developing the types and quantities of machine tools to be included on Schedules A the basis for the trigger contract. It was decided to review Schedule A at least every six months or as often as it might be necessary to include changes that will reflect technological developments, new production methods and improved requirement data.

It was quite clear that the points of difference between industry and Government in the proposed contract have, to all intents and purposes, been worked out in discussions between the representatives of the Government and of the industry. The object, of course, is, in the words of Government representatives, "The trigger feature in the contract is of vital importance in accomplishing a principal objective of the program, i.e., to buy essential time through pre-planning."

It was agreed that all machine tools for which orders are accepted under the contract should not be removed from Schedule A until they are either shipped or invoiced to the buyer. The main problem, it was felt, was to determine the difference between special tooling and special or single-purpose machines and of deciding on what basis such machines should be removed from the pool order contract at some point in their production.

The discussion about working capital made quite clear that in obtaining advance loans, particularly to ease possible difficulties of smaller businesses, those which have trouble in making loans through private credit arrangements, would have ample cooperation from the various Government departments and agencies. One of the Government representatives pointed out that a contractor who undertakes an obligation under any trigger-type contract has the responsibility for planning his financing as well as production to every extent possible in advance of mobilization. It was suggested machine tool builders might consider making arrangements with private lending institutions for Government-guaranteed working capital advances, using the pool order contract as a basis for the arrangements he suggested. ● ● ●



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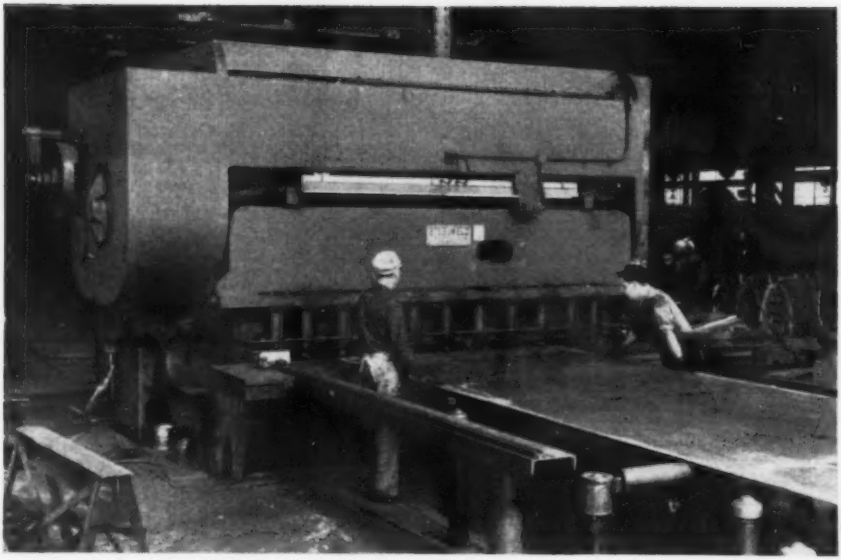
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Leaders OF THOUGHT IN INDUSTRY

An Interview with James D. Greensward

Vice-president and Director of Manufacturing, Allis-Chalmers Manufacturing Company

Q. Mr. Greensward, we have heard so much about automation and special machines that our readers would like to know to what extent the Allis-Chalmers Manufacturing Company is using special machines.

A. Special machinery in the line of automation is dependent entirely on the products and whether automation becomes efficient and, of course, automation as it is known today is the installation of machinery to reduce labor, costs, reduce handling, and to produce things as efficiently as possible, and we do that wherever the so-called automation is seen to be necessary. I don't know what other things you could put on it, there are some times when you have parts in high volumes that are duplicates or similar even though the large machine itself may be one of this kind or one of that kind

Q. If you use special machinery now, do your plans call for more in the years to come?

A. Our plans call for more wherever, mentioned before, they have some usage.

Q. There is considerable argument as to whether a shop with limited production runs can or cannot use special machinery, what is your opinion regarding this?

A. Again, that special machinery has to be used on some types of products whether you have limited production runs or high production runs. We will always have special machinery for our type of work. We only have special machinery for instance in making steam turbine blades where we have high volumes and even though there are very few turbines of duplicate design or duplicate ratings that are built.

Q. Because of the competitive situation of all business and the need to reduce manufacturing costs, can you tell our readers what methods you employ to reduce costs. Do you reduce costs by increasing production without adding to the manufacturing cost?

A. Of course, production programs are something that we study all the time and they are never exactly the same from one month to another. However, there are certain fundamentals in cost reduction that are carried on always. Some of those fundamentals are in the lines of better methods studies throughout the factory. In other words, we tackle every product and every program with the idea of using better methods in actually machining or assembling or of handling material, and also in watching the designs before they get into the manufacturing. We have, in addition to our regular planning staff that plans methods and production, another so-called general planning staff whose fundamental purpose is to be working with the engineers and the designers at the time the product is being designed so that in all cases we attempt to design to fit our facilities so that it can be produced economically. In other words, we don't wait until the drawings are made and then go through the entire planning. We do a great deal of the planning at the time the drawings are being made and sometimes design to fit the economical manufacture.

Q. Would that general planning staff be considered as a part of a central authority?

A. No, not necessarily central authority. In each of our works such as Boston, Pittsburgh, Cincinnati, Terre Haute, Milwaukee, each of these have their own central authority and cost reduction programs, and in many cases a group of people who are doing nothing but working on these so-called cost reduction programs. However, they are supervised and helped and suggested to by our over-all plant engineering group, central planning group, and the so-called, as you might word it, central authority, to assist them and see to it that they are carrying on the programs in the correct method depending upon the products made at each of the individual factories.

Q. Do you think that the purchase of new machine tools can help to increase production and at the same time reduce costs?

A. Well, we do of course have that experience. The new machine tools increase production because the new machine tool can take advantage of these new cutting tools which are available. A lot of the old machine tools do not have either the speed or the strength to take advantage of the new techniques. The new machine tools do cut costs. They are also made so that we can do much of our work more accurately than we were able to do it in the past and in doing it more accurately that tends toward reducing costs in assembly and in other places along the line.

Q. You are constantly looking at the new machine tools with this in mind rather than straight replacement are you not?



James D. Greensward, vice president and director of manufacturing, Industries Group, Allis-Chalmers Manufacturing Company, began his career with the company in 1922 as a co-operative student while attending Marquette University in Milwaukee. Under this program he alternated a period of schooling with a period of shop work.

Upon receiving his electrical engineering degree from Marquette in 1925, he was assigned to Allis-Chalmers electrical department.

In 1936, Greensward was placed in charge of sales for the firm's switchgear section and in 1942 he was appointed assistant manager of the central station and marine department. A year later he became assistant to the treasurer in charge of contract termination.

In 1946, Greensward was named assistant to the vice president of what is today the company's Industries Group. He became general manager of the Norwood (Ohio) Works in 1949 and remained there for three years until taking over his present post.

Greensward is a native of Savanna, Illinois, where he received his elementary schooling. While general manager of the Norwood (Ohio) Works he served a term as president of the Cincinnati Industrial Institute.

A. New machine tools get rather a thorough going over in our company from various points of view. Of course, there is a replacement program. A machine tool requiring maintenance and getting it at such an age that it is not doing an efficient job is considered for retirement. This applies to any tool that we have in the factory. We may have to retire a tool because of its excessive maintenance and its lack of ability to perform today's functions even though it may not be completely worn out or anything like that. New machine tools are to perform definite functions and therefore we want them to perform that function as economically as possible. They are checked not only by the production department of the factories for the purposes they have to accomplish, but we also check all these special tools with the engineering people to be sure that when we buy an expensive special tool that it is in line with their future thinking of the design of the products that have to go with those tools. So replacement program is one thing for consideration, the other thing for consideration is cost reduction. And then, of course, the other item is that you have to have the tool or you have to have the method in order to produce a product at all.

Q. Well, how does your general machine tool replacement program work? Is it each plant that decides or do you have a general over-all program?

A. No. Each plant makes its review of its tools periodically and each factory will recommend what they think should be replaced and the reasons therefore. After the recommendation is received in this office it is again checked by our plant engineering department and tool engineering department to see that their recommendation is sound; that there may be something better than what they recommend; or there may be other methods of accomplishing the same end rather than buying a tool. As an example of that, a 72″ boring

mill was required for a tank and plate shop and that particular group of people wanted to buy a new 72" boring mill. That was fine and everyone agreed that it was needed. However, we did not buy a new one, we took a 72" boring mill out of another factory that was five years old and put it in the tank and plate shop because the accuracies that they require in a tank and plate shop are usually not required in producing such items as generators, steam turbines, blowers, etc. So we use a movement program in machine tools as well as acquisition. We will take a tool that may be only a few years old and put it into a plant or into an operation that does not require the speeds and accuracies and then buy the new tool for the position that requires very high speeds or very close tolerances in the products that it has to make. It isn't just to buy a tool to put into a factory. We take advantage of the fact that we are a big company and use our tools to their most economical purposes.

Q. Methods, planning and process engineers are beginning to assume greater importance in our production picture. You have engineers with such titles, can you tell us what their specific job functions are and to what extent are they consulted in the purchase of new machines?

A. Well, our planning departments are fundamentally made up of engineers either by formal training or by training of experience and, of course, any tools that we buy are first of all a requirement of the planning of our work, so they would probably be one of the first although not necessarily always the first to initiate such a recommendation for a purchase. In the planning of their work they know the various methods of how a piece or a product can be made and they are charged with the responsibility of knowing the most economical methods, and if they feel that tools are available on the market that we don't have that would accomplish the most economical methods, it is their responsibility to recommend the tools also. Our engineers and our people in our planning departments and the people responsible for manufacturing do not just rest at one place in the factory or in one factory. They are sent out to all of our factories and other people's factories so that they know what is going on in the world. For example, at the Machine Tool Show in Chicago we sent all of our supervision to the show in bus loads every day so that they would have that knowledge of what was being offered. In other words, we feel that the factory can be run better by having a large group of people knowing how things should be made rather than just a small group of people. We don't rely entirely on the planning people. It's our superintendents, general foremen, foremen, and assistant foremen, who are also interested in economical production.

Q. Then the Machine Tool Show would be of considerable benefit to you and your supervisory staff in keeping you up-to-date?

A. We feel that it is. It is one method of getting a quick look at what's going on. However, we don't rely on it entirely. We send people out to the machine tool builders' factories to see what's going on. And, of course, the machine tool builders invite us to see

things that they are doing also, and we take advantage of it. We work in very close cooperation with the machine tool builders because they have many instances of where they can, if they are going to perform the right service for us, make recommendations also as to what we should do. And we consider their recommendations the same as we consider any other source of information. They are of great value to us.

Q. In your opinion, what is the biggest problem facing production today?

A. It would be hard to say which is the greatest problem. There are many problems. I think expanding of production, so to speak. One of the greatest problems is training people. If you are going to build a new factory, it's fairly easy to create the brick and the mortar, the cement and the steam work and the machine tools and everything that go into the factory. The biggest problem is to train the workmen and to train the supervision in all the operations that go into the new factory so that you if you would try to pick out the greatest problem for expanding a production or for starting a new factory, or in going through new methods, the greatest problem I think is in the schooling and training of our workers and our supervision, and creating more people that are able to do certain jobs and keeping them well educated as to what must be done in order to efficiently compete in the free market that we have.

Q. Would you include keeping cost in proportion with increased production a part of this problem?

A. That's part of the problem. If you increase production you have to train more workers and train more supervision.

Q. Do you find that as you increase production your costs start to skyrocket?

A. Naturally, they would increase some, temporarily, but as you can increase production it depends upon what facilities you provide as well as the supervision and the training of the people, and if you are going to a new product or a new factory, naturally the experience would be that the cost would be higher for a short time. But that wouldn't be a continuous process. Naturally, the costs would come back down again with proper relationship to the cost of material and the cost of labor and the cost of your facilities.

Q. How can small business compete with bigger industries and in what area lies their biggest opportunity? This is speaking only from the production and manufacturing standpoint and not from marketing or selling.

A. I haven't noticed any particular difficulty in the smaller factories competing with us on similar work. As a matter of fact, there are quite a few different types of work which we do subcontract to smaller business because they are specialized in a certain work that we may not be, and they can do the job cheaper than we can. It would seem to me again that you are relating this problem back to what other people specialize in. The people that are specialized in tool and die work, for example, are naturally very efficient and I have no occasion to believe that the tool and die makers in smaller factories have

any trouble meeting the same kind of costs that we have in tool and die work. I think it depends upon what they specialize in and the facilities that they have. And if they have the proper facilities, stay in the field of which they are specialized in, they can easily compete with the larger manufacturers.

Q. At Allis-Chalmers here don't you face a different set of problems from other manufacturers. You have a regular line of standard products, don't you also build special equipment, not machine tools; to handle this situation is your division divided into several parts, or is it all one?

A. Well, our industries group is divided into three divisions, we have the general products division, the industrial equipment division and the power equipment division. We make different products at Boston, which is concentrating mostly on circuit breakers, and the Pittsburgh Works which is concentrating on transformers, distribution transformers and some sizes of power transformers. We have our Cincinnati Works which is called Norwood Works and which builds the smaller sizes of motors and the smaller sizes of centrifugal pumps. At the West Allis works we build the larger sizes of that so-called same equipment plus other products. We build the larger transformers, we build the larger centrifugal pumps and also in this same factory we build the steam turbines, generators, condensers, blowers, things like that, that require large machinery. So we are specialized in our works, in the type of facilities that we have fitting the type of products that we manufacture. While it is true that at West Allis the same horizontal drilling, boring and milling machine may be used on a steam turbine today and on a crusher part tomorrow, those types of tools are more universal tools or standard tools and they are for those kinds of products. At the same time, we have the special tools which are just for steam turbine work only, such as the milling and broaching machine for steam turbine spindles and a milling machine for rotor slots and generators and many special tools that are used only on certain products. They are tooled for the product itself and some of our tools, while they are used on several products they are more or less standard tools.

Q. What are some of the problems peculiar to your special equipment section? Don't you take in jobs which are one-of-a-kind type of equipment?

A. Yes, we do occasionally build something that we have never built before, but it is usually somewhat allied to the products that we regularly manufacture. We build a lot of equipment, a lot of products to very special designs for a special customer which we would never have any hopes of ever building again, but that customer wants that particular product and so we design it and build it. I think you have to remember that Allis-Chalmers is not only a manufacturing company, but we have a wide variety of engineering talent and therefore there are very few things the company could not tackle successfully, engineer, design and manufacture. We are called upon many times to build some special products that we have never built before, especially in war time and a great many of those cases, although not entirely, are allied to the products we have been building. It de-

pends upon the type of special product the customer may want us to build and that again would depend upon what product department it would go into. It might go into the steam turbine department, it might go into our processing machinery department. For example, a sifter. While sifters, as such, were primarily developed for the food industry and flour mill work and things like that, however, there are sifters of special design that are made for other people in the chemical industry as an example. And so, while that isn't a food product for which it was originally developed, it is a modification we might say or an adaptation of other sifters that we have built and fit very nicely into the customers requirements. So that kind of a problem would go to the processing machinery department.

Q. Do you do any rebuilding of your machine tools or do you do any building of any machine tools?

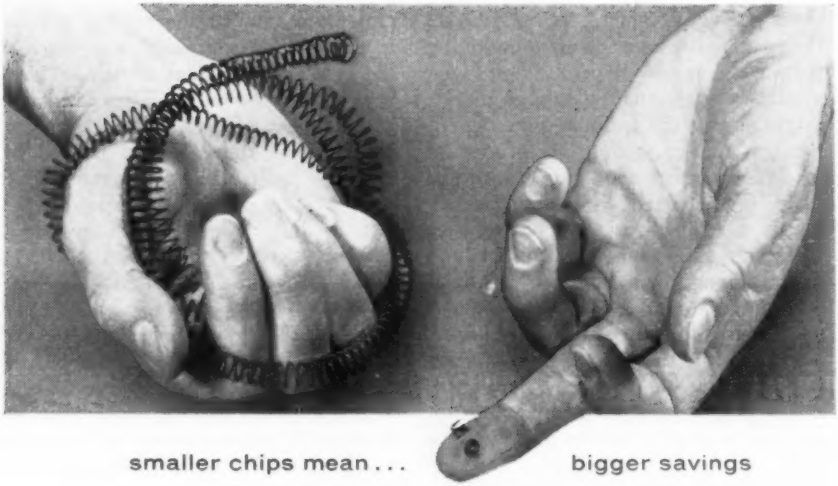
A. We attempt not to build machine tools. We do the maintenance of our tools and may build a few parts that go into our tools if they are not readily available, but there are occasions when working with the machine tool builders we may build part of the machine tool because that tool is designed and built only for our applications. But the general philosophy or the general practice is that we do not build any machine tools. We build a lot of special tools that nobody else builds. They may come in the form of winding machines or other things that are just needed for our own products. As an example, we have adapted a boring mill into a special drilling machine and we have adapted a turret lathe into a special drilling machine, but that's the one-time adaptation, so to speak, for a certain run of our products, and we can do it quickly and make these adaptations to those special machine tools or to the standard machine tools. But we have no desire whatsoever to be in the machine tool business. We want to stick to our own bidding.

Q. Mr. Greensward, in conclusion, could you give me your business outlook for this year?

A. The business outlook this far, as we see it at the present time, is that this next year will be at a volume that will at least be as good as 1955 and may be a fair amount better. With our diversity of products we naturally have some products that are up and some that are down in the various cycles of business, but over-all our forward picture is quite encouraging and we are quite confident that our volume will be higher in 1956 than it was in 1955.

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Engineering For You and Me

Part 2.

Strength, Fatigue, Failure in Fasteners

By **Harry Conn,** Chief Engineer
Scully-Jones & Company
Chicago, Ill.

- √ *what factors can and do cause failures in dynamically stressed parts*
- √ *stress in a full length threaded bolt is uniform throughout the portion between the two nut faces*
- √ *loads that are applied suddenly develop twice the stress of a static load*
- √ *fatigue strength is improved as the shank diameter is reduced*
- √ *you can increase strength by chemical changes and also by heat treating but not the stiffness*

BECAUSE manufacturers are eternally faced with two problems, cost cutting and improvement of quality, it might be well to consider some of the various ways and means of achieving these goals. The constant attention to these two problems has been one of the most important factors in the technological improvements and industrial expansion in our country. When cost is cut and price is reduced there is usually an increase in volume sales and a need for greater facilities. If the consumer has received an item of quality that makes it an economic investment of real value, the manufacturer usually gains a repeat customer. The objective of every manufacturer should be to serve his customers at a profit.

It has been found that unless the customer is served there is no profit and if the manufacturer does not derive

a profit his existence is not justified in the eyes of the stockholders. To serve at a profit often involves a cutting of manufacturing cost which must also improve the quality of the item.

Our objective in the next few pages will be to review how this can be done by considering the mechanical, physical

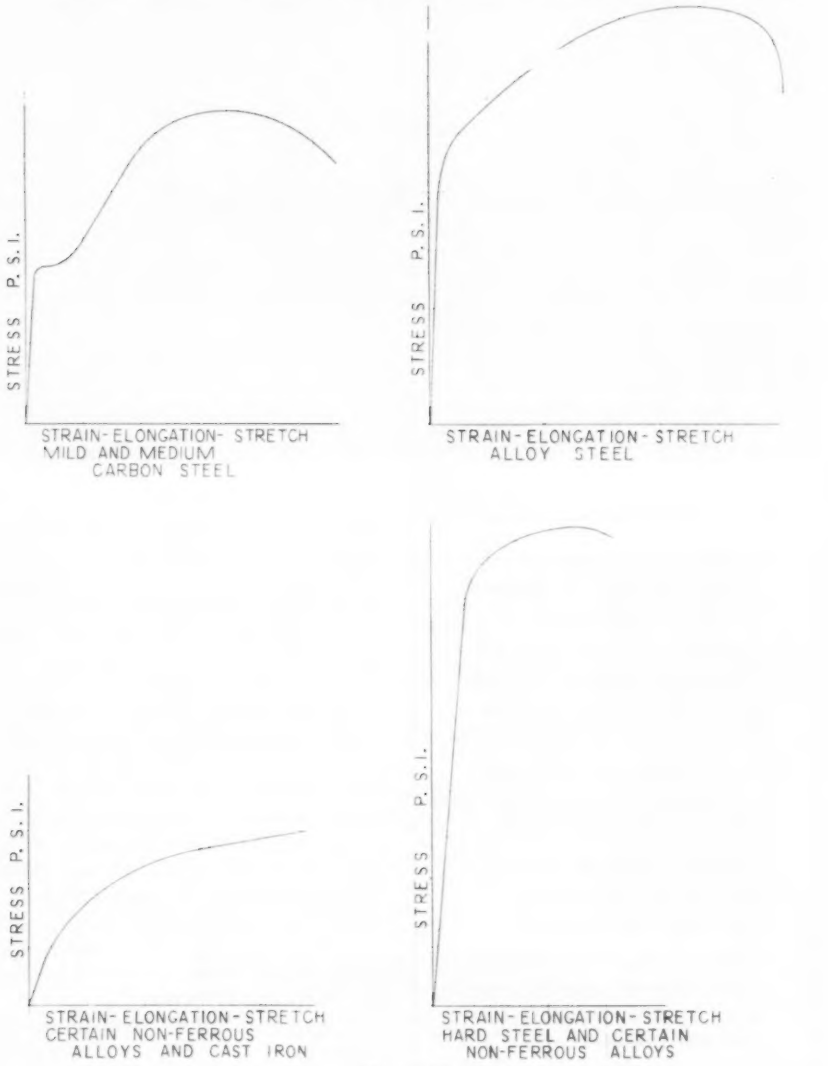


Figure 12

". . . unless the customer is served there is no profit and if the manufacturer does not derive a profit his existence is not justified."

and chemical properties of metals to a small degree.

The stress-strain curves shown in figure 12 indicate that every metal has a characteristic tensile test diagram, the shape of which will depend on the chemical composition and the treatment the material has received. Once the values of the stress and strain curve have been determined, the first of many design considerations and steps has been accomplished.

When the percentage of carbon in steel is increased, the proportional limit and ultimate strength increase while the ductility properties, as measured by the reduction of area and elongation decrease.

The engineer realizes that low-carbon steels show low elastic properties but high ductility, and that high carbon steels show high elastic properties but low ductility. Figure 13 shows the effect of carbon content on tensile properties of carbon steels. It can be seen that the increase in tensile strength of the metals is about 1,000 pounds per square inch for each 0.01% increase in carbon content.

In view of the fact that the increase in carbon lowers the ductility values, means other than carbon increase must be used in order to develop superior tensile properties. One method is normalizing or annealing the steel. Steel as it leaves the mold or roll, is in a more or less coarse granular condition. Normalizing and annealing treatments break up the coarse structure and bring about grain refinement which improves the tensile-test properties.

Where an untreated carbon steel shaft is not strong enough, considerable improvement can be obtained by heat treatment and much more by the use of heat treated alloy steels, but if greater stiffness or rigidity is required no improvement results from heat treatment or the use of better materials as deflection is entirely unrelated to strength. Unless the length or span is reduced, the only way that the deflection can be reduced is by increasing the size of the member as the modulus of elasticity of all steel is practically the same. By the same token,

Effect of Carbon Content on Tensile Properties of Carbon Steel

Carbon %	Yield Point, lb/in.^{2}	Tensile Strength, lb/in.^{2}	Elongation, % in 2 in.	Reduction of Area %
0.06	29,000	47,000	46	75
0.38	45,000	67,000	35	56
0.60	54,000	94,000	20	40
0.89	56,000	117,000	13	15

Figure 13

it is quite apparent that a machine member may be designed so as to resist the same forces and loads and yet be much smaller and lighter by increasing the carbon content or adding a heat treating operation, providing stiffness is not a controlling factor.

The improvements in tensile strength of steel resulting from heat treating operations can readily be noted in figures 14 and 15.

Elongation and Reduction of area computations are usually used as a measure of ductility but in recent years this has become a very controversial subject. Designers differ quite sharply as to whether elongation or reduction of area constitute reliable design data. For certain aluminum aircraft alloys an elongation of 1 or 2% is sufficient to relieve stress concentrations due to rivet holes. Alloys that are normally considered brittle have much greater elongation capabilities than 2%. Most authorities regard the ductility specifications as quality indexes, that is, as aids in determining whether or not an alloy was properly prepared. In other words, if a steel has an elongation of 25% at 70,000 PSI and during test if a specimen falls short of this standard, it is rejected. It is not rejected because it will fail in service but because it indicates that some unknown has crept into the processing that may cause failure.

Actually there are more industrial machine members and parts that have their dimensions determined on the bases of stiffness than on strength requirements. Machine tool spindles and shafts must be stiff enough to give accurate cuts without leaving chatter marks on the part, which isn't only undesirable for the part but also reduces tool life. Limits to deflection are particularly necessary in shafts which carry gears or clutches so that excessive wear of the teeth due to misalignment will be avoided and also the binding of spindles in their bearings.

If you will take a walk through a small town junk yard you will notice that some parts outlived their expectancy, some were obsolete but many parts show evidence of failure. Many failures were due to carelessness on the part of the operator but many were also the responsibility of the designer. A trained and experienced engineer will notice such causes for failure as buckling, mechanical fretting, lack of strength, excessive deflection, corrosion fatigue, mechanical pitting, improper assembly techniques, etc.

A part may be designed that will

Tensile Properties of 0.37% Carbon Steel (Rolled)

State	Proportional Limit lb/in.^{2}	Yield Point, lb/in.^{2}	Tensile Strength, lb/in.^{2}	Elongation, %	Reduction of Area, %
Rolled	27,000	31,000	74,000	32	48.6
Annealed	36,500	37,800	70,000	32	49.0
Normalized	38,000	41,500	79,200	29	46.0

Figure 14

Figure 15

Material	Size Rounds in Inches	Tensile Strength	Yield Point	Elongation Percent	Reduction Area	Brinell Hardness
SAE 1020 Hot Rolled	1	65,000	40,000	30	55	130
SAE 1020 Hot Rolled	6	60,000	35,000	30	40	120
SAE 1020 Forged	12	55,000	30,000	20	30	110
SAE 1040 Hot Rolled	1	94,000	58,000	27	52	187
SAE 1040 Hot Rolled	6	84,000	46,000	19	30	160
SAE 1040 Forged	12	82,000	44,000	16	28	160
SAE 1040 Hot Rolled Water-Quenched Tempered at 1200° F.	1	100,000	70,000	27	60	200
SAE 1040 Hot Rolled Water-Quenched Tempered at 1200° F.	6	82,000	52,000	25	48	160
SAE 1040 Forged Water-Quenched Tempered at 1200° F.	12	78,000	44,000	23	44	155
SAE 2340 Hot Rolled Oil-Quenched Tempered at 1200° F.	1	112,000	85,000	25	63	230
SAE 2340 Hot Rolled Oil-Quenched Tempered at 1200° F.	6	104,000	75,000	27	58	210
SAE 2340 Forged Oil-Quenched Tempered at 1200° F.	12	100,000	70,000	21	48	200
SAE 2340 Forged Normalized Tempered at 1200° F.	12	100,000	65,000	20	45	200
SAE 4140 Hot Rolled Oil-Quenched Tempered at 1200° F.	1	145,000	125,000	17	56	293
SAE 4140 Hot Rolled Oil-Quenched Tempered at 1200° F.	6	108,000	80,000	21	54	220
SAE 4140 Forged Oil-Quenched Tempered at 1200° F.	12	103,000	65,000	20	45	210
SAE 4140 Forged Normalized Tempered at 1200° F.	12	95,000	57,000	21	48	190
SAE 4340 Hot Rolled Oil-Quenched Tempered at 1200° F.	1	150,000	130,000	20	58	302
SAE 4340 Hot Rolled Oil-Quenched Tempered at 1200° F.	6	125,000	100,000	18	54	250
SAE 4340 Forged Oil-Quenched Tempered at 1200° F.	12	110,000	90,000	17	50	230
SAE 4340 Forged Normalized Tempered at 1200° F.	12	95,000	70,000	20	45	220

> ***"... elongation of area computations are usually used as a measure of ductility but in recent years this has become a controversial subject."***

be strong enough, stiff enough, hard enough, tough enough, be correct in many other ways yet fail in service. The next few pages will be devoted to considerations and various factors that can and do cause failures in dynamically stressed parts.

The material commonly used for high-pressure-steel valve flanges is known as SAE 4140 and is heat treated to the ASTM Specification A96-39 Class C and A193-44T Grade B7. The heat treatment gives a minimum yield point of 105,000 psi. If steel, as stated previously, elongates .001 per inch for each 30,000 pounds of stress per square inch, then any inch of Grade B7 bolt can be stretched 0.003-in. and return to its original one inch length after having been loaded to a stress of 90,000 psi. In actual usage, the bolts are stretched to a 0.0015-in. per inch elongation for a stress of 45,000 psi.

This provides a high initial compression to set the gasket firmly in place and stores energy or springiness in the bolt to provide for subsequent relaxation at high temperatures. The loading is not too high to allow for stress concentration at the root of the threads, torsion stresses set up in tightening, bending that may take place from misalignment between nut bearing surfaces and not threads and soft plated coatings that can be displaced.

Any bolt or stud should be tightened to an internal stress that exceeds the external load if the load or stress is of a dynamic or shock loading.

Tests show that the stress in a full-length-threaded bolt is uniform throughout the portion between the two nut faces. At the clamping face of each nut it begins to fall off fairly regular until at the top of the nut it is found to be zero. At least it is that way with standard nuts. In other words, if a stud has a stress of 60,000 psi in its main portion, the portion at the center of the nut has a stress of about 30,000 psi and the part that projects from the top of the nut has a stress of zero. Please notice carefully the way a nut is stressed because this is of utmost importance. The sum of the elongation of the bolt or stud within the nut is therefore about half what it would be if that section were uniformly loaded to 60,000 psi.

When designing a threaded fastener the most widely accepted practice in use today is to use the mean thread area of the threaded portion as the bases for computing area in square inches. Figure 16 shows the amount of area in square inches for the various sizes of standard threads. The mean area is obtained by adding the pitch diameter and the root diameter and dividing the sum by two.

Loading of the machine members seems to fall into several categories, the main ones are static loading, cyclic loading and shock loading. A **static load** is one which does not vary in direction, magnitude or point of application. Some examples of static loads are those on members due to tightening-up on bolts, dead weights, constant speed, centrifugal speeds and welded assemblies.

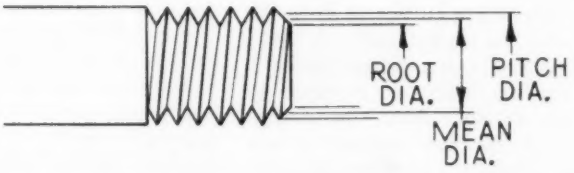
A **cyclic load** is one that induces stresses which vary in magnitude and

direction and may or may not be accompanied by shock. Examples of cyclic loads are those on a gear tooth and loads on a rotating shaft subjected to a bending movement such as a milling machine arbor and cutter. These are sometimes referred to as a fatigue load. Shock loads are due to impact such as a connecting rod, crankshaft, punch press rams, connecting rod bolts, cylinder head bolts undergo when in use.

When parts are subjected to a shock load which is always applied by an external force or source of energy, they

Figure 16

MEAN THREAD AREA



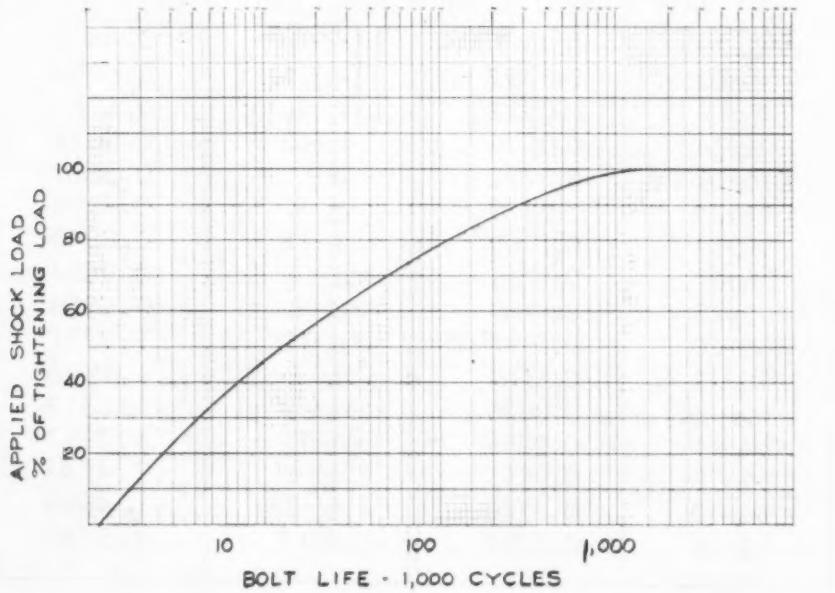
NOMINAL SIZE AND THREADS PER INCH	MEAN THREAD AREA (STRESS AREA) SQ. IN.	NOMINAL SIZE AND THREADS PER INCH	MEAN THREAD AREA (STRESS AREA) SQ. IN.
1/4-20	0.0317	7/8-9	0.4612
1/4-20	0.0362	7/8-14	0.5088
5/16-18	0.0522	1"-8	0.6051
5/16-24	0.0579	1"-12	0.6624
3/8-16	0.0773	1 1/8-7	0.7627
3/8-24	0.0876	1 1/8-8	0.7896
7/16-14	0.1060	1 1/8-12	0.8549
7/16-20	0.1185	1 1/4-7	0.9684
1/2-13	0.1416	1 1/4-8	0.9985
1/2-20	0.1597	1 1/4-12	1.0721
9/16-12	0.1816	1 3/8-6	1.1538
9/16-18	0.2026	1 3/8-8	1.2319
5/8-11	0.2256	1 3/8-12	1.3137
5/8-18	0.2555	1 1/2-6	1.4041
3/4-10	0.3340	1 1/2-8	1.4899
3/4-16	0.3724	1 1/2-12	1.5799

> ***". . . a part may be designed that will be strong, stiff and hard enough, be correct in many ways yet fail in service."***

must be able to store up the energy that will be more than equal to the induced stress energy. When designing for shock loads perhaps one of the most important points to consider is that of endurance limit. The endurance limit of a material for a particular range of stress is the maximum induced stress that the material can withstand without failure for an indefinite number of repetitions of the stress. In bolted members, if the bolt tension is not sufficient to hold the members together at a stress that exceeds the external stress exerted upon the bolt it will fail in a definite number of cycles. Figure 17 shows a logarithmic curve that gives the relationship between the applied shock load and the anticipated life of the bolt. It is readily seen that when the tightening load exceeds the shock load the bolt will have infinite life. Loads that are applied suddenly develop twice the stress of a static load.

In the case of a threaded bolt, if the thread is cut on the shank so that the root diameter is less than the bolt diameter then the stress developed by impact will be greater at the threaded portion. If the shank of the bolt is reduced in the central section to a diameter equal to, or less than, the root diameter, then a greater volume of material will be more highly stressed than in the former case and the energy-

Figure 17



". . . any bolt or stud should be tightened to an internal stress that exceeds the external load if the load or stress is of dynamic or shock loading."

absorbing capacity will be increased. This increase in impact strength, which is the result of undercutting the bolt shank is of real importance in highly stressed bolts. It is evident that when a nut is tightened on a bolt that is not undercut the stress is limited to the mean thread area and that is where the stretch or elongation occurs, which is in approximately one half the thickness of a standard nut. When the bolt is undercut to a diameter less than the mean thread area the stretch will take place, over the length of the undercut and this is also the increase in volume needed to withstand the shock energy or to store an amount greater than the induced impact energy. If the thread is cut to the bolt head this will also help to distribute the stress and its effect which is strain or elongation.

In figure 18 are shown two (2) bolts that are identical with the exceptions that the shank of bolt **B** is undercut for a length L_1 to a diameter equal to the mean thread area D_1. Under static loading the strength of each bolt is the same, because they both have the same mean thread area. If subjected to energy loads, bolt **B** will be able to absorb more strain energy than bolt **A** without being permanently deformed or stretched, because of the greater volume of material subjected to higher stress.

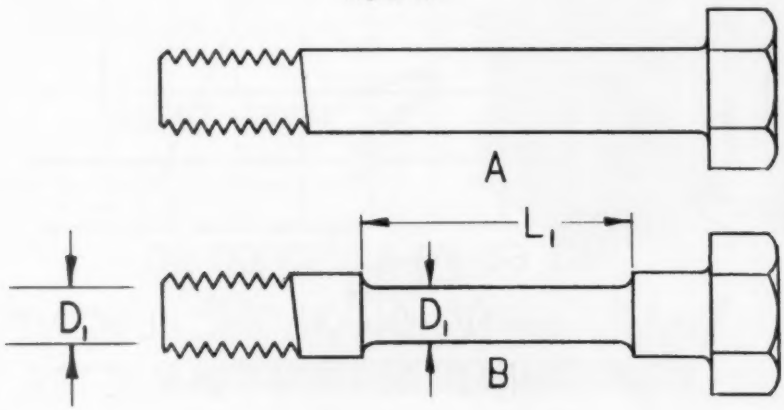
This can be rather crudely explained by the formulas for strain or elongation that was used in the preceding pages.

$$\text{Stretch or Elongation} = \frac{PL}{AE}$$

$$\text{Stretch or Elongation} = \frac{\text{Load x Length}}{\text{Area in Sq. In. x Modulus of Elasticity}}$$

It can readily be seen that by reducing the area **A,** or the modulus of

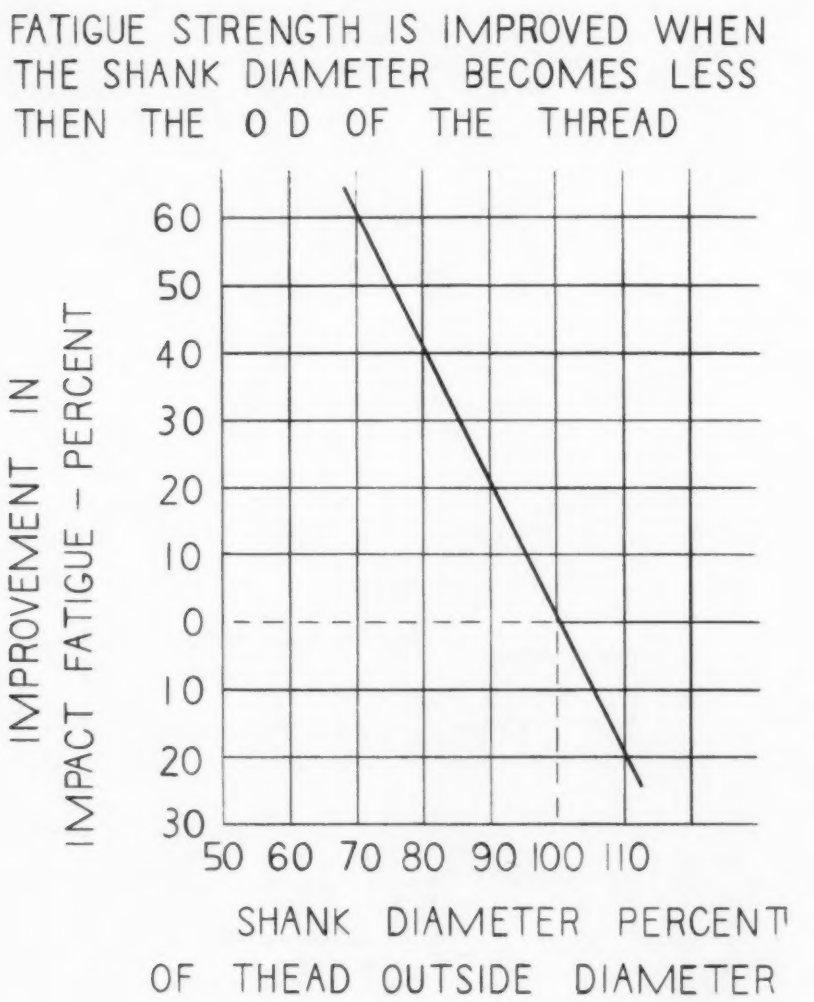
Figure 18



elasticity **E** (using, for instance rubber instead of steel or some other material with a lower modulus of elasticity or with a higher modulus of resilience) or by increasing length **L** these changes would allow a greater elongation or storing of energy.

Take two bars ten inches long, one has a cross sectional area of one square inch, the other has an area of one

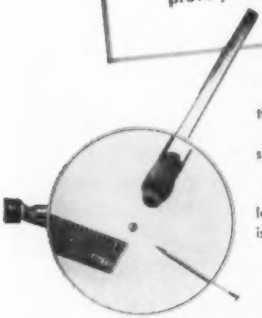
Figure 19



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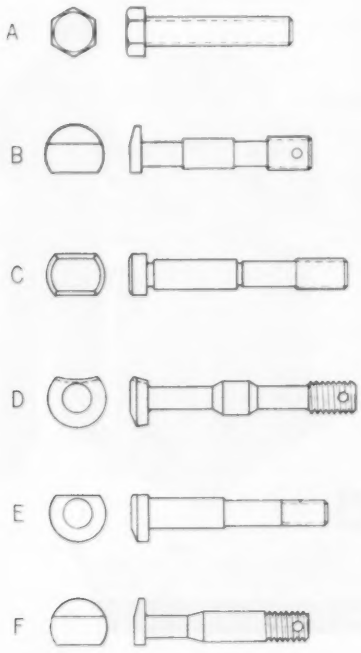
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". . . in bolted members, if the bolt tension is not sufficient to hold the members together at a stress that exceeds the external stress exerted upon the bolt it will fail in a definite number of cycles."

square inch for five inches and is stepped up to two square inches for the other five inches. Both bars are subjected to an axial energy load, and a limiting stress of 30,000 PSI. The bar which is smaller by 1/3 in volume which in this case is ten inches long and has the one square inch of cross-sectional area is able to withstand an energy load eight times as great. In other words, reducing the shank diameter makes the bolt more springy. It has been proven that under impact loads that as the bolt shank is decreased the energy required to fracture it is correspondingly increased. It is now a well established fact that metals can be made to fail under the action of cyclic stress although the maximum stress of the cycles is far below the static breaking strength.

Figure 20



The chart in figure 19 shows how the fatigue strength is improved as the shank diameter is reduced. It also shows that when the shank diameter is larger than the outside diameter of thread the fatigue strength is reduced. In figure 20 are shown several different designs of connecting rod bolts that are in use today. An appreciable improvement in the resistance to shock loading can be obtained by providing a rounded circumferential groove in the shank immediately below the threads. Bolt **A** in figure 20 is not a connecting rod bolt.

Figure 21 shows the experimental confirmation of the theory that as the bolt shank is decreased the energy required to fracture it is correspondingly increased. This work was done by the German Scientist, W. Staedel and is discussed in his book "Fatigue Strength of Screws," published by Darmstadt in 1933. Please note that in figure 21 the thread on each bolt is the same, and the bolts are similar in every way mechanically and metallurgically possible with the exception of the diameter of the bolt shanks. Almost all well designed bolts that are used in shock

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loading conditions incorporate his findings and assumptions.

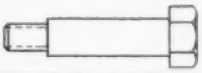
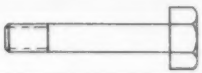
Wth the improvements that we now have in metallurgy, heat treating and bolt design it is easily understood why we don't have near the trouble with burned out connecting rod bearings that we had in the early days of the automobile. Much of the early troubles was because the bolts stretched so much under load that a clearance, impossible to measure, was introduced and thereby introduced many other problems into the bearing.

It can be noticed that each of these connecting rod bolts have a portion in the middle that is enlarged so as to reduce the bending in the bolt in the section between the connecting rod and the cap. This almost eliminates bending of the bolts in service and it has been observed that fatigue failures of bolts are seldom due to purely axial loads.

". . . in the case of a threaded bolt, if the thread is cut on the shank so that the root diameter is less than the bolt diameter then the stress developed by impact will be greater than the threaded portion."

A bolt can be designed so as to have the correct physical size and contour, material, heat treating and will still fail in service after a very short time if it is used under shock load conditions and has not been tightened to

Figure 21

BOLT DESIGN	BOLT BODY		BOLT BODY AREA, PER CENT OF AREA AT BOTTOM OF THREAD	REPEATED IMPACT VALUE	
	DIAMETER IN.	AREA IN^2		IN. LB.	%
	15/32	0.175	230	1.73	100
	25/64	0.122	160	2.60	150
	5/16	0.076	100	4.34	250
	9/32	0.060	78	5.21	300
	15/64	0.044	57	6.51	375

STEEL – 0.15 % C. – 0 65 % MN. TENSILE STRENGTH 78,200 LB/IN^2

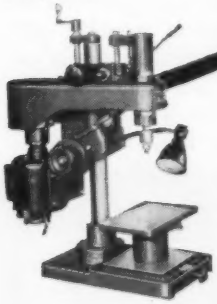
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> ***". . . reducing the shank diameter makes the bolt more springy."***

the correct torque. If the bolt has been tightened to a stress greater than the external stress upon it, when in operation it will have infinite life as shown in figure 17 if other design factors are correctly considered.

Tensile strength is a strength factor and modulus of rigidity a stiffness factor or ratio. If one understands these terms he can increase the strength by chemical changes and also by heat treating but not improve the stiffness. These tools are real tools for decreasing weight and cutting costs. Almost all screw companies furnish charts that enable designers to utilize their products to obtain the lowest cost and at the same time improve the end product. The charts specify the correct tensile strength and torque needed to obtain the stress desired by the designers.

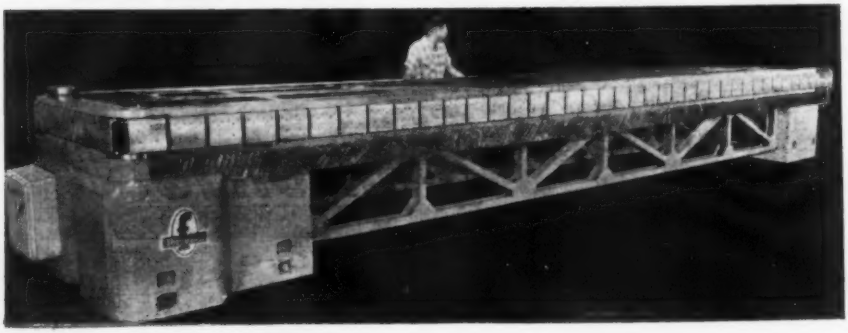
End of part 2. Part 3 will appear in March.

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The Ferguson Machine & Tool Company's standard straight line transfer machine, the Trans-O-Mator, is meeting the special requirements of an automotive components manufacturer. By combining the frames of two standard units, normally 32 inches wide x 11 feet long with 40 usable stations, the company provided a machine 64 inches wide x 30 feet long with 88 usable stations. The increased length was achieved merely by increasing the span between the end frames.

Only one standardized power transmission unit was utilized to accomplish a 9" stroke with a transfer time of 1.3 seconds for a load up to 30 pounds per station. Ferguson's standard control panel, with an electrical interlock system between the indexing and tooling power supply, start, stop and jog controls and provisions for automatic scanning of stations was used for the special application. The purchaser has tooled the machine to assemble automatic steering gear couplings at a rate up to 3600 pieces per hour. Ferguson Machine & Tool Co., Roller Gear Div., P.O. Box 5841, St. Louis 21, Mo.



- No Skilled Labor
- Low Tool Cost
- Low Production Cost
- Good Physical Qualities
- One-Piece Part
- Low Material Waste
- High Production Rate
- Close Tolerances

Here's How Powdered Metallurgy Can Save You Money

By **Samuel Bradbury, III,** and **George Karian,**
F. J. Stokes Machine Co., Philadelphia, Pa.

Part 2: The Application, Advantages and Limitations of Powdered Metallurgy.

● In general, the best applications of powder metallurgy are those in which powder metal processing replaces casting, forging, stamping, machining and other forming operations because parts can be made to equal specifications at greatly reduced cost. Often a single powder metal part can be made to replace an assembly of two or more solid metal parts. These are constantly widening fields. Expanding markets, increased production, standardization of parts, adaptive design changes, and improvement in powder metallurgy technique bring more and more machine-formed parts into the scope of powder metal production by making the cost-differential in favor of powder metal processing irresistibly attractive.

Hundreds, perhaps thousands, of products are now being made successfully and profitably by powder metal processing.

POWDERED METALLURGY . . .

Special applications of powder metallurgy are those which accomplish a result not possible except by powder metallurgy. These include, among others, parts in which different metals or substances are combined to give final characteristics which cannot be achieved by mechanical joining or alloying.

Examples of such products are:

Copper combined with steel to make a self-brazing alloy.

Lead dispersed in copper for bearing surfaces; the former to give anti-friction properties, the latter for strength.

Oil combined interstitially with metal to give continuous self-lubrication.

Copper combined with carbon, as in commutator brushes; the former for conductivity and the latter for anti-friction properties.

Silver (or copper) combined with tungsten to make contact points; the former for high conductivity, the latter for resistance to heat and wear.

The joining of pigtails to commutator brushes.

Mixtures of copper, tin, iron, lead, graphite, and silica to make heavy duty friction surfaces.

Such examples illustrate certain unique characteristics which, viewed as principles, offer the possibility of solving new problems.

Several of these examples show combinations of metals which are unalloyable in the usual sense. If alloying is attempted the elements tend to segregate because of incompatibility but by powder metal processing they are combined so that the finished product has the desired characteristics of each element.

Similarly, metals and non-metals are conveniently joined by powder metallurgy, as in the case of copper-carbon brushes and copper leads. In such cases an inserting operation is called for in the processing, and of course each of the combining substances must be able to tolerate the heat of sintering. There are broad and varied possibilities in this field.

The porosity of powder metal parts is a valuable major characteristic, especially as it is controllable. Porosity implies some sacrifice of tensile strength as compared with solid metal, but even this can be increased by heat-treating when desired. Often, to be sure, tensile strength is not a factor, and the porous product is always lighter than the solid metal.

The self-lubricating bearing is the outstanding example under this classification. Pressed from metal powders such as copper and tin, to which may be added a small percentage of graphite, they are then sintered under suitable conditions. The finished bearing is designedly not solid metal, but possesses a degree of porosity which can be controlled within relatively wide limits (up to 35% or 40% by volume). These pores are interconnected and transmit oil held therein to the supported shaft through capillary effect. Oil stored in the bearing (by impregnation) is thus automatically and uniformly distributed to the working surface.

The electrical industry makes use of powder metallurgy to produce contacts combining the high conductivity of silver or copper with the resistance to wear and high arcing temperatures of such metals as tungsten. By pressing intimate mixtures of these powders and then sintering the compacts, the briquetted products become bonded and

PART: Adding machine dash dot plunger.

MATERIAL: Iron powder.

FORMER METHOD: Machined from steel bar stock.

POWDERED METAL PRODUCTION DATA: Part made from powdered metal is formed to close tolerances, sintered and then oil impregnated for permanent lubrication.



develop high mechanical strength, even though the diffusion of one metal into another is hardly appreciable.

Similarly, copper and lead are combined to produce automobile starting motor brushes and motor brushes of various kinds.

Metals and non-metals are combined in the manufacture of radio tuning cores and similar parts, where the particles of iron must be insulated from one another to obtain the best electrical properties. Thus, powdered iron is coated with a dissolved resin and then dried, so that when compressed, the iron particles are separated by a resin film.

Powder metallurgy is used very successfully in the manufacture of friction materials. Special purpose brake linings and clutch facings contain metals to conduct the heat, iron to produce a hard matrix, lead and graphite to provide lubrication, and non-metallic friction materials such as silica or emery. It is interesting to note that the surface temperature of the brake of an airplane landing at 100 miles per hour may be as high as 1200°F. Regular organic bonding materials, such as used on automobile brake linings, would be unsatisfactory for such services.

One of the outstanding uses of powder metallurgy is the combination of hard materials in a metal matrix. Most important in this classification are the tungsten carbide products. Tungsten carbide particles are mixed with powdered cobalt, a wax binder and then compressed and sintered. Cobalt thus adds toughness and resistance to shock to the hardness contributed by the carbide. "The wax serves as a temporary binder for the unsintered compact."

Other examples in this classification are diamond-impregnated grinding wheels, drill core bits, and dressing and cutting tools, wherein various metal powders are used to form a tough, durable matrix holding the diamonds in place.

Alnico permanent magnets, composed of aluminum, nickel, cobalt and iron, can be made either from metal powders or by casting. The alloy has

poor casting properties and is unmachinable. The very small sizes are more conveniently made by pressing the mixed powders. An additional advantage is that pressed magnets may need no finish to size or only a light grinding after sintering. Finishing of castings, however, to approximate the clean-cut appearance of the powder-produced magnets, requires an additional and costly grinding operation. The powder method produces a fine-grain structure, having considerably higher mechanical strength than the coarse-grained magnets formed by casting.

The field of mechanical parts appears to offer the greatest possibilities of expansion. Until now, most mechanical parts have been produced by jobbers who have maintained prices at relatively high levels, even though costs, in many cases, may have been only a fraction of those by competitive methods. Attracted by the possibility of substantial savings, private plants are now starting to install their own equipment and manufacture their own parts. If this trend continues as expected, it should create an unlimited market. A large number of mechanical parts of different shapes and sizes are already being produced of powdered metals and new applications are appearing daily.

Advantages of Powder Metallurgy

Low material waste: There is usually very little material waste associated with powdered metal parts manufacture since there is little or no scrap loss. Powder losses generally run below 0.5%. In melting and casting operations on small parts, on the other hand, the sprues and risers may be several times the weight of the finished casting. In addition, machining operations on cast parts may remove from 10% to 50% of the metal, and while most of it is recoverable as scrap, it represents a loss in the manufacturing process.

No skilled labor: Highly skilled labor is not required for most operations in the powder method. Except for the construction of the necessary dies and die parts, semi-skilled labor may be used.

Low tool cost: Tooling costs are relatively low in comparison with other high production methods, and less time is usually required to set up for production.

Close tolerances: Close dimensional tolerances on small or medium sized parts up to about 2″ major dimension can be secured, averaging plus or minus 0.001″. Closer tolerances of plus or minus 0.0005″are attainable and may be even smaller on special production jobs. On larger parts, the tolerances may be in the order of plus or minus 0.002″. Frequently, however, accuracy of dimensions is attained through coining or repressing the sintered part.

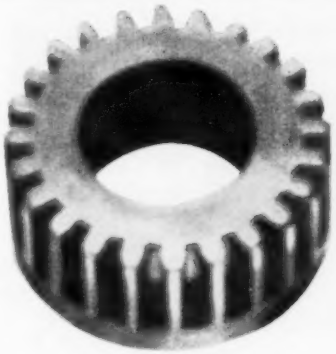
Low production cost: The powder method of manufacture may be more economical in many instances due to factors such as rapid quantity production, lower labor costs, ease of setting up, conservation of material, and elimination of machining operations. A reported instance of analysis of the normal cost of producing approximately 100 different units used in a piece of Ordnance equipment revealed that powder metal parts effected a saving of about 70%. Handling and inspection operations can also be cut down.

High production rates: High production rates, especially on small parts, can be attained by use of automatic presses

PART: Traverse cam spur gear

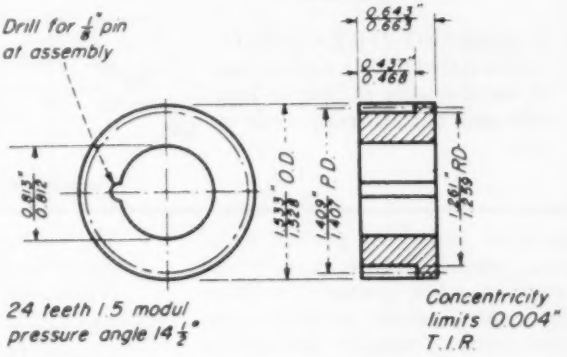
MATERIAL: Iron powder

FORMER METHOD: Formerly machined from steel bar stock requiring 14 operations; these included automatic screw machine operations and cutting teeth on gear shaper.



POWDERED METAL PRODUCTION DATA:

Powder metal part requires no machining operations. Tolerances on inside diameter held to .001".



Traverse cam spur gear

and continuous type sintering furnaces.

Good physical qualities: A wide range of physical properties can be obtained. Control can be exercised over such properties as density, porosity, grain size, and strength by variation of the type and size of powdered particles, die pressure, and sintering time and temperature. In some instances such as small Alnico magnets, structures developed may have better mechanical properties than the same material in cast form. The same type of fine grain structure developed in laboratory samples of iron parts compacted at high pressures and sintered at relatively low temperatures, also exhibits superior tensile properties.

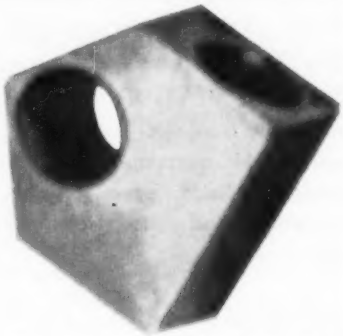
Parts can be produced which are not possible by other methods: Structures, alloys or materials not possible by other means can be produced by powder methods. These include porous bearings, sintered carbides, refractory metals such as tungsten and tantalum, and combinations of metals, and of metals and non-metals that do not alloy.

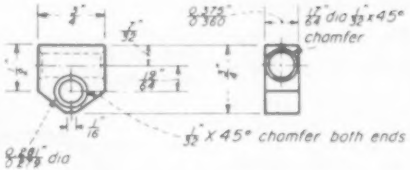
One-piece part instead of several: It is possible in many instances to make

PART: Stop motion push rod block.

MATERIAL: 80/20 leaded brass powder

FORMER METHOD: Made of steel bar stock requiring 14 machining operations.





Stop motion push rod block

POWDERED METAL PRODUCTION DATA: Powder metal requires only drilling of long hole and chamfering ends of hole.

a one-piece part from powder metal whereas several different parts would be required when produced by other methods. Also, powder parts often can be redesigned to simplify the unit in which they are used. For example, use of square holes to eliminate keying, or use of porous part to permit self-lubrication and eliminate external lubrication, etc.

Limitations

There are certain limitations to the design of parts to be made by powder metallurgy which must be considered:

a. The surfaces formed by the top and bottom punch faces should be parallel or nearly so.

b. Multiple planes to be formed in the direction of pressing call for multiple punch members—either spring loaded or actuated by multiple motions provided for by the press.

c. The configuration of the surface perpendicular to the punch faces is practically unlimited.

d. The part must naturally be ejected straight from the die. In other words, back drafts, undercuts and sidedraws are to be avoided.

e. The chief limitation to the **maximum size** is the availability of automatic presses in which parts may be made to economically compete with other methods. The largest fully automatic press available at present has a capacity of 300 tons with which parts having an area of 6 square inches up to 15 square inches may be made depending on the material to be pressed.

f. The limitations to the **minimum size** is the relative ease with which powder may be fed to the die.

PART: Cam shaft starting pawl

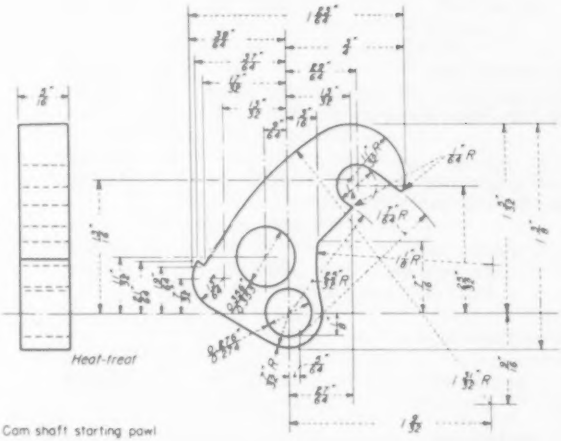
MATERIAL: Iron powder

FORMER METHOD: Made of two steel punchings spot welded to form one piece and cyanided; required 15 operations excluding cleaning.



POWDERED METAL PRODUCTION DATA:

Powder metal part does not require any machining and welding operations. Tolerances on diameter of holes held to .002".



Cam shaft starting pawl

Generally the minimum wall thickness or diameter is considered to be about .030" although smaller parts have been made. This ring (example) is .060" O.D. x .040" I.D. Thus it has a die wall of only .010" and a special powder had to be prepared to assure regular and even filling of the die. It is made of iron oxide for use in electronic computing machines.

Powders Available

To obtain certain parts, powders of various metals are used. Parts of brass, stainless steel and some alloy steels are made from pre-alloyed powders. The majority of parts, however, are made from the powder of a single metal or a mixture of several metal powders to obtain the desired physical properties.

By the proper selection of the powder or powders a wide range of physical properties may be obtained. The porosity of the part may be controlled for self lubricating purposes or for filtering. On the other hand, parts having low porosity can be produced to achieve high tensile strengths of elongation characteristics as desired.

Composition	Molding Pressure Tons/Sq."	Tensile Strength Pounds/Sq Inch		Elongation %
		Sintered	Coined (5)	
Reduced iron plus ½% to 1% lubricant	30 - 50	10,000 20,000	20,000 35,000	5 - 8
Electrolytic iron plus ½% to 1% lubricant	30 - 50	20,000 30,000	30,000 40,000	6 - 12
90-95% reduced iron 5-10% copper plus ½% to 1% lubricant	30 - 50	30,000 40,000	35,000 45,000	1 - 3
90-95% electric iron 5-10% copper plus ½% to 1% lubricant	30 - 50	35,000 50,000	45,000 55,000	3 - 6
98-99.5% reduced iron ½% to 2% graphite plus ½% to 1% lubricant	30 - 50	30,000 45,000	40,000 60,000 (4)	1 - 2
98-99.5% electric iron ½% to 1% graphite plus ½% to 1% lubricant	30 - 50	40,000 60,000	50,000 75,000 (4)	2 - 5
90-95% reduced iron 5-9% copper ½% to 1% graphite ½% to 1% lubricant	25 - 50	40,000 55,000	50,000 60,000 (4)	1 - 2
90-95% electric iron 5-9% copper ½% to 1% graphite ½% to 1% lubricant	25 - 50	50,000 60,000	60,000 80,000 (4)	2 - 5
Reduced iron compact sintered & subsequently infiltrated with 25% to 40% Cu or Cu alloy	25 - 35	80,000 120,000 (2)	———	3 - 10
Brass powder Approx. { 78.5 Cu, 20 Zn, 1.5 Pb } plus ½% to 1% lubricant	30 - 50	25,000 30,000	35,000 45,000	10 - 25
Bronze 90 Cu, 10 Sn plus ½% to 1% lubricant	10 - 25	15,000 25,000	25,000 35,000	5 - 15

(1) Case hardened by gas or pack carburizing. (2) Solution treated at 1500°-1600° F. q 10 min. @ 1800°-1900° F.—coin—then final sinter—cannot be coined after final sin physical properties are approximate.

Hardness		Can Be Sized To High Accuracy	Powder Cost ¢/Lb	Typical Uses
Sintered	Heat Treated			
Below RB Scale	To 40 Rc (1)	Yes	10 - 18	Pole pieces, toy wheels. (1) Gears, cams, bushings—low strength and impact
Below RB Scale	To 60 Rc (1)	Yes	25 - 45	High density pole pieces. (1) Gears, cams—good strength and impact resistance
To 30 RB	To 25 Rc (1) (2)	Yes	11 - 18	Oil-less bearings, cams—fair strength and impact. Large dim. change on sintering
To 60 RB	To 30 Rc (1) (2)	Yes	30 - 50	Machine parts, cams—good strength and impact—large dimensional change on sintering
To 40 RB	To 40 Rc (3)	No	11 - 18	Oil-less bearings, gears, machine parts, cams—good wear and strength—low impact.
To 60 RB	To 50 Rc (3)	No	25 - 45	Gears, machine parts, cams—good wear, strength and impact.
To 50 RB	To 30 Rc (2) (3)	No	13.5-19	Caster wheels, cams, machine parts, gears—good wear and strength—fair impact.
To 70 RB	To 40 Rc (2) (3)	No	32 - 50	Machine parts — high strength, good wear and impact.
To 80 RB	To 40 Rc (1) (2)	Yes	18 - 24	Very high strength and impact, good wear resistance — Turbojet blades, washing machine gears, high stress machine parts—can be easily brazed and plated.
Below RB scale	To 40 RB with coining	Yes	40	Lock parts, ordnance, non-ferrous gears and machine parts.
Below RB scale	To 25 RB with coining	Yes	50	Oil-less bearings, friction plates, machine parts.

uenched, aged @ 900° F. (3) Oil quenched from 1500°-1550° F. (4) For coining—presinter ter. (5) Coined at pressure 50% higher or equal to molding pressure. The above figures for

PART: Gear used in Business Machine

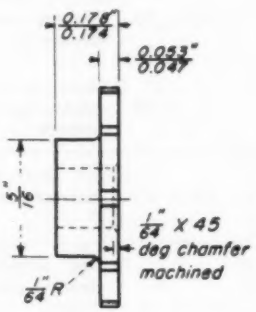
MATERIAL: 80/20 brass leaded powder

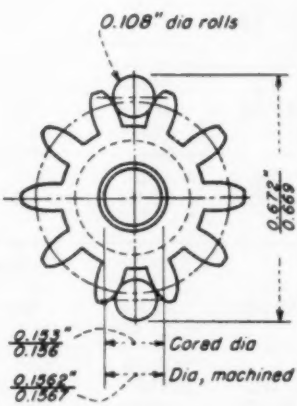
FORMER METHOD: Made of steel bar stock requiring 14 operations.



POWDERED METAL PRODUCTION DATA:

Only machining required is to finish ream and chamfer.





Electroplating and surface oxidizing treatments are also possibilities to obtain hardness or non-corrosive properties.

The accompanying table gives specific properties obtained from various powder metal compositions and treatments, and an idea of cost for the raw material.

The End.

High Tensile Powder Metal Parts Made by Infiltrating With Copper

The infiltration treatment for iron powder parts is valuable for pieces which need usually high strength or which will be subject to shock. Turbine blades, chopping units, and door lock rotors are typical.

The infiltration process is aimed to get 100% density by filling the porosi-

Talking About Die Sets



with
Phil Marsilius
Vice-President
The Producto Machine Co.

"Tooling for Tomorrow"—This month's ASTE Exposition in Chicago offers you an opportunity to find out whether your tooling practices and facilities are keeping pace with the many technological advances being made throughout industry. You will be able to see the latest tooling developments on display in more than 450 exhibits.

Major die set advances have been made since the last Tool Show and many of the leading die set manufacturers will be exhibiting them at the International Amphitheatre. "Tooling for Tomorrow" includes radical changes in the design, appearance, performance and accuracy of die sets and their components; new lubrication methods; and numerous new die accessories. The Tool Show is a rare occasion for you to inspect, compare and select the developments best suited to your particular die set requirements.

Related diemaking equipment, of course, will be displayed along with thousands of other products intended to improve your manufacturing operations. The editorial pages of this magazine give you an excellent preview of some of the outstanding tools, machines, materials and processes to be demonstrated for the first time in Chicago on March 19-23.

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ties in powder metal parts with a metal of a lower melting point than the metal of which the part is made. This copper is used to infiltrate iron powder parts, achieving densities in the range of 99+%.

This raises tensile strengths—around 40,000 psi for pure iron and 75,000 psi for iron mixed with graphite—to a figure of 90,000 to 100,000 psi. Heat treating will further raise this figure to 120,000 psi or more.

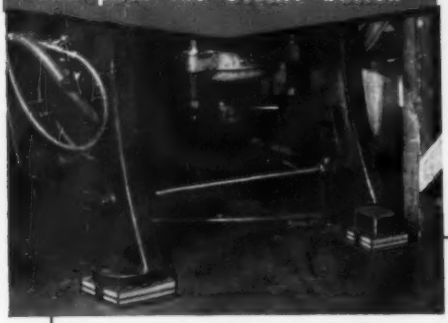
Infiltration is accomplished by placing a small length of copper on top of the iron piece and heating until the copper melts, at which point the iron absorbs the copper as a sponge absorbs ink. The operation is usually done after sintering though it may be done before if there are no thin sections which may suffer distortion from the entrance of the new metal.

The amount of infiltrated metal to be used is determined by volume requirements, i.e., the porosity of the piece and the relative specific gravity of the infiltrated to the infiltrating material. Thus an iron piece (average sp. gr. 8.00) of 40% porosity weighing one pound would require 0.4 pound of iron to reach 100% density. For infiltrating with copper (average sp. gr. 8.86) about 0.443 pound would be needed.

It beats the Dutch what the engineers are doing! One powder metal enthusiast recently squeezed copper powder so hard that he produced a piece of +9.00 sp. gr.—heavier than pure copper! Reminds us of an engineer friend who set up a vacuum pump and found it was operating at 108% efficiency. (Took him a week to find the error in his figures.) ● ● ●

NO CEMENT OR BOLTS

. . . You just "sit" machines on patented AIR-LOC 4.17.4 and push the START button



No. 21 Bliss Press installed on AIR-LOC pads for over a year. Vibration and noise both reduced.

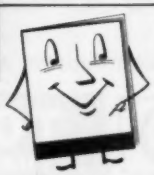
Installation costs go down. No more floor drilling or waiting for cement to dry.

Over 50% Present Orders from Satisfied Users

Up to 72 tons per sq. ft. can be mounted on AIR-LOC with absolute safety.

Machine Installation Costs Take a Tumble Today

AIR-LOC can be re-used because it is not cemented, and won't "pad down". Less *time* needed for each installation.



BOOKLET describes this engineered (patented) mounting pad. Ask for the AIR-LOC booklet from Clark, Cutler, McDermott Co., W. Central Street, Franklin, Mass.

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actual PERFORMANCE has the EDGE here!



F & D Tools maintain the exacting standards of quality necessary to guarantee the most consistent cutting tools ever made. Our "Step Tooth" design assures you the most versatile tool available today. Write today for the address of your local distributor and our latest catalog.

FOR DISTRIBUTOR AREAS STILL OPEN PLEASE CONTACT

F&D TOOL CO., INC.
THREE RIVERS, MASSACHUSETTS

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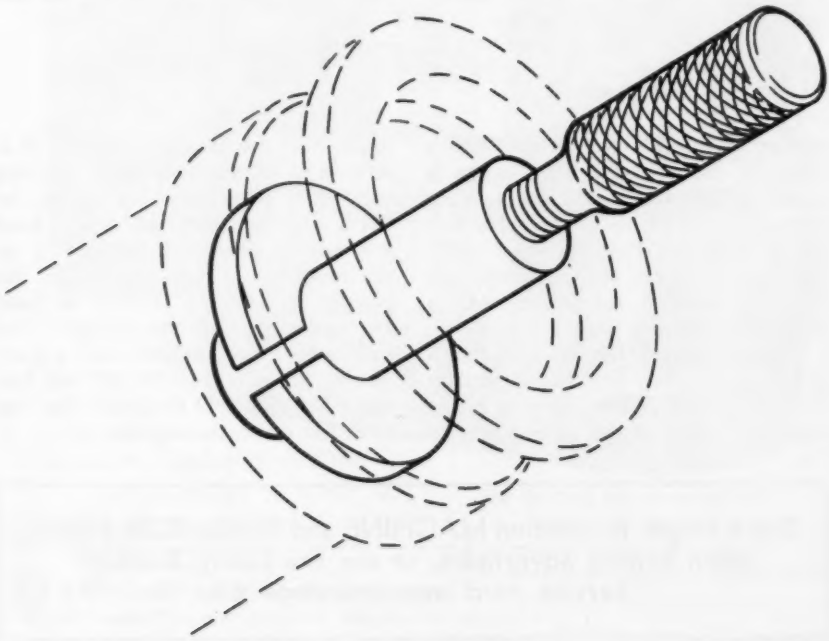
Shop Hints

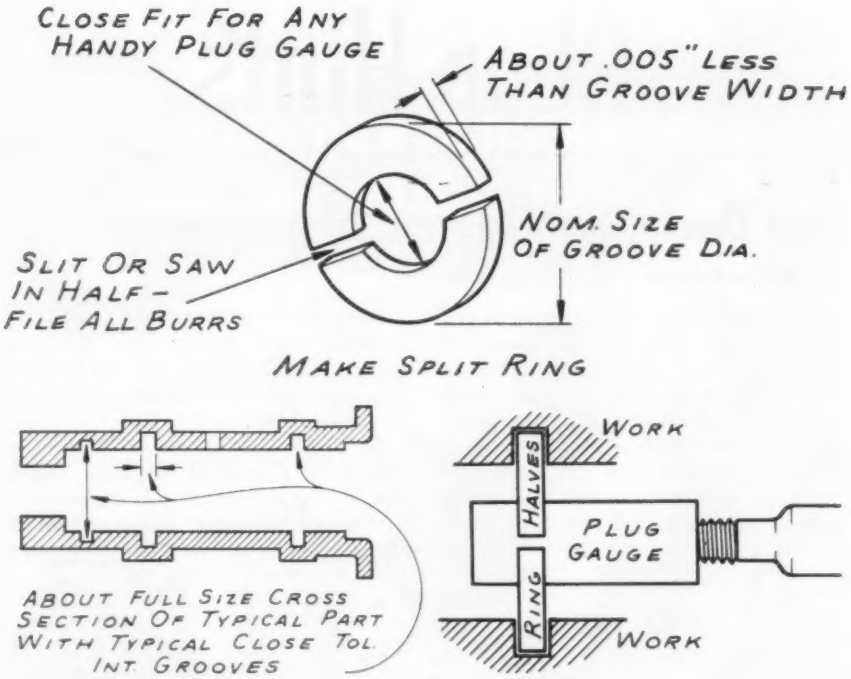
Tool Checks Small Internal Counterbores

by **Phil McCafferty**

Small diameter internal grooves and counterbores—such as are found in equipment and parts using hydraulic "O" rings, snap rings etc.—are rough to check while machining. Frequently they are too small or too narrow to allow use of dial bore gauges; too far into the work to use special internal groove mikes; the smaller bore diameter is too small for inside mikes; the grooves or counterbores are completely internal, thus ruling out telescope gauges; inside calipers are out because you can't get them out to measure—lots of hitches.

So here's how to do it. Machine a ring from a scrap of bar stock. Make the OD the size of the low tolerance of the groove diameter. Ream a hole in the center of the ring to accept any





convenient round plug gauge, with a close fit. Be sure the plug gauge is small enough to fit into the smallest bore in the part to be grooved. Cut off or face the ring to about .005" less than the width of the groove. Split the ring through the center with a hacksaw or slitting mill.

To use the tool, first make a rough grooving cut. Place the two ring halves into the groove. When the plug gauge will just "go" in the ring segments center hole the groove is on size. It is difficult to tell you how much material to remove when sneaking up on the finish size, but once the tool is used it is easy to determine very closely by the look of the ring halves in the groove. It is easily possible to hold .001" tolerance with this gadget. If the tool is to be used regularly it is a good plan to make a "go—not go" set. Just make one ring OD on finish size, the other five or ten thousandths under.

Don't forget to mention MACHINE and TOOL BLUE BOOK when writing advertisers, or use the handy Readers' Service card opposite page 64.

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The DeVlieg Microbore exhibit will include a wide range of Precision Tooling for general purpose and production applications

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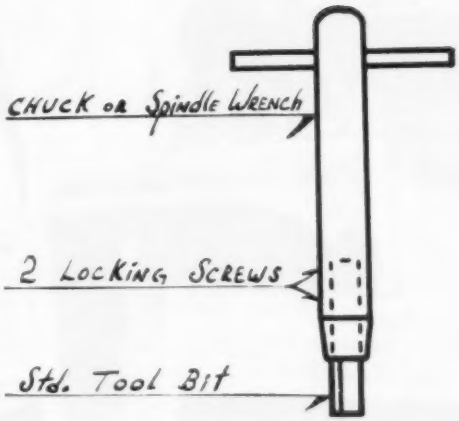
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Shop Hints

Square Pegs in Round Holes

by **Edward McIntyre**

Wear on chuck and spindle wrenches occurs on the corners or key section. The corners become rounded or mutilated and will not hold. This type of wrench can be readily salvaged at a small fraction of its original cost. See illustration.



Cut off the worn or key section only. Select a standard high speed tool bit for the required size. Drill a round hole in the key section of the shank to accept the square tool bit.

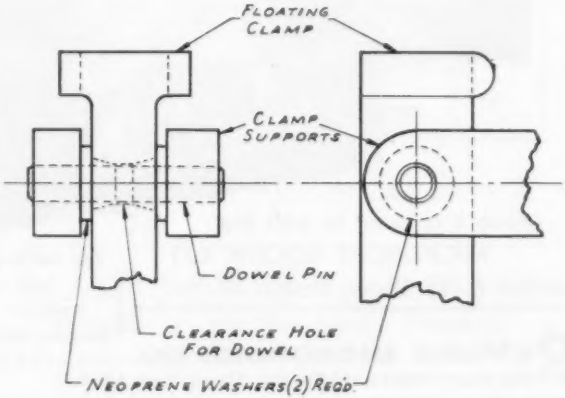
Drill and tap two small holes for Allen screws to secure the tool bit into position. Now you have a chuck wrench better than new because the worn section can always be quickly replaced.

Floating Clamp with Sealing Washers

by **A. B. Anderson**

When clamping a rough casting for a milling operation, it is necessary to provide both a floating action and a sealing effect for the clamping member. The sealing effect is as important as the floating action because an improperly sealed clamp will eventually be rendered inoperative by milling chips.

The illustration shows a very simple solution



"RODGERS PLATEN PRESS GIVES US

FAST CYCLING WITH COMPLETE SAFETY"

—SAYS VEIT AND YOUNG



Rodgers 400-ton platen press in use at Veit and Young, Huntingdon Valley, Pa., metalworking specialists. The press is equipped with die cushion, fast cycling cylinders and other accessories. Some of the products formed are stacked by the press.

Production has been increased in drawing and forming large serving trays and electrical panels by Veit and Young with their Rodgers Platen Press. Safety controls permit operators to concentrate on speed and accuracy. They are working type 303 stainless steel, brass, carbon steel, aluminum—from 1/32" to 1/8" thick with bends up to 90°.

Auxiliary cylinders lower and raise platen quickly for fast cycling. Forming pressures are preset from 80 to 400 tons—die cushion up to 50 tons. Simple, fast adjustments govern all platen, pressure and time cycles. If you work in metal, plastic, rubber, veneers—you can mold, draw, form—*faster* with a Rodgers Platen Press. Capacities 10 to 600 tons. Send for Rodgers "Blue Ribbon" Platen Press Catalog.

HI-PRESSURE Rodgers HYDRAULICS

Rodgers Hydraulic Inc.

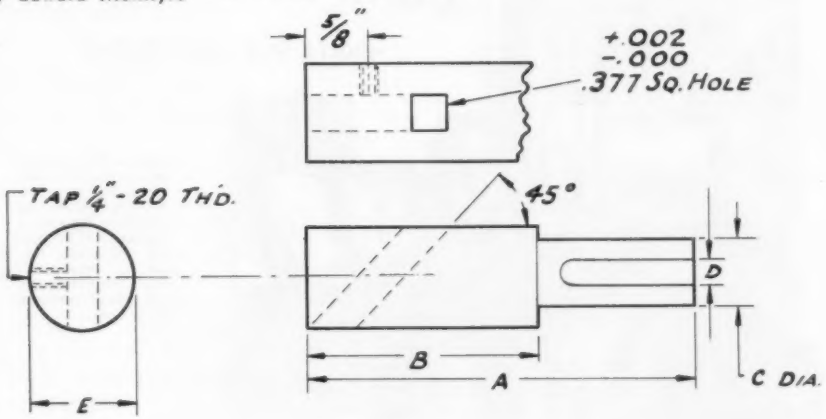
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to this problem. A neoprene or rubber washer is placed on each side of the clamp as shown. A clearance hole, taper reamed at each end, allows the clamp to float on its mounting dowel pin. This design may be applied to any clamping condition with which chip disposal is a problem.

General Purpose Tool

by **Edward McIntyre**



FLY CUTTER HOLDER

M-NUMBER	A	B	C	D	E	CUTTER NO.
M-8060	4"	2"	.625	1/4 FLAT	1"	M-8040
M-8061	4"	2"	.625	1/4 FLAT	2"	M-8040

Illustration shows a chart of fly-cutter tool holders designed for general purpose applications on milling machines.

This holder, simple of design and inexpensive to make, will soon pay for itself even if it is used for emergency purposes only.

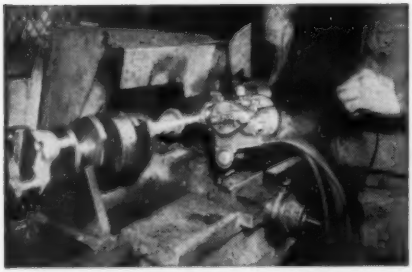
Lathe Fixture

by **Alex S. Arnott**

A simple but effective design of a lathe fixture is shown in sketch and this tool is designed to hold the large ring X as the operator machines 1/16" off the face. The ring is 10 inches outside diameter and 6 inches inside diameter.

The spigot **A** centers the fixture in the lathe which is held in place through the bolts at **B.** The face **C** is machined

when mistakes happen...



Automotive crankshaft being brought up to inspection standards with metallizing. This automotive manufacturer formerly used plating for this type of salvage, worked one per hour. With metallizing, the salvage operation requires only 5 to 10 minutes per shaft, including surface preparation.

...and they do in any busy machine shop, there's no need to scrap a mis-machined or otherwise damaged machine part that represents an investment of many expensive man-hours.

Parts like these are brought up to inspection standards quickly, easily and inexpensively with metallizing.

And with the new molybdenum metallizing wire, Sprabond, the only surface preparation required is cleaning. The molybdenum forms a molecular bond with the surface being rebuilt. Little heat is generated, eliminating any danger of warpage.

What's more—users have found that the extreme hardness of the molybdenum coating, and its microscopic porosity which provides superior lubricating characteristics, improve its "wear-ability" over ordinary bearing surfaces as much as 25 times. **You haven't just salvaged a part—you've improved it.**



Free Bulletin

Get the full story on metallizing in production salvage. Bulletin 57-C describes and illustrates the procedures, provides data on typical parts, with interesting photo-micrographs showing the unique bonding action of Sprabond Wire. Send for a copy.

The trade name, SPRABOND WIRE, is the property of Metallizing Engineering Co., Inc.

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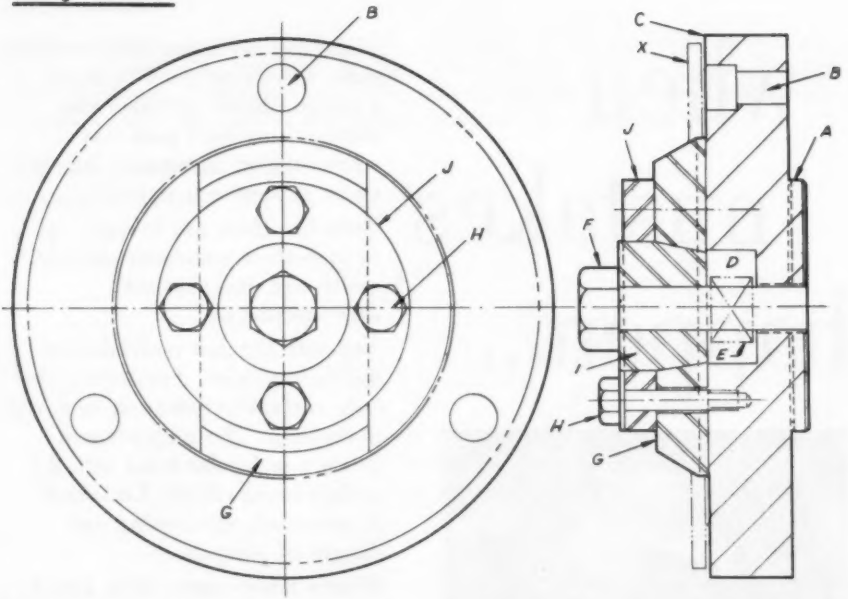
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Shop Hints



level and the face is bored at **D** for the compression spring **E**. A clamping bolt **F** is threaded into the fixture body. Two sliding jaws **G** are turned at the outside diameter to suit the inside diameter of the ring and they are held to the fixture with the bolts **H** which are shouldered, allowing the jaws to move through a slot in the jaw.

The center piece **I** is tapered to match the jaw taper and is guided by the ring **J**.

In operation the rings are placed over the movable jaws **G** and the bolt **F** is turned, moving the center piece **I** inward. The jaws **G** move along the taper, gripping the ring and holding it in place for the machining operation. When the bolt is loosened the spring pushes out the center piece, allowing the jaws to drop away from the ring, when it can be removed from the fixture.



The BLUE BOOK Salutes Its 1906 Advertisers

No. 3 in a series:



By **D. M. Carlson,** Assistant Editor

Geometric Tool Company

While in England in 1891, William J. Smith, a mechanic of inventive mind, met C. S. Larrabee, president of the Larrabee Machinery Co., Boston, Mass. Larrabee suggested that a tool that would bore irregular-shaped holes in wood and metals would make a fortune for its inventor. Smith said he thought he could invent such a machine—and he did. The first one was made in England. Larrabee was delighted with it, and financed the production of 50

Ladies rifle team 1924.

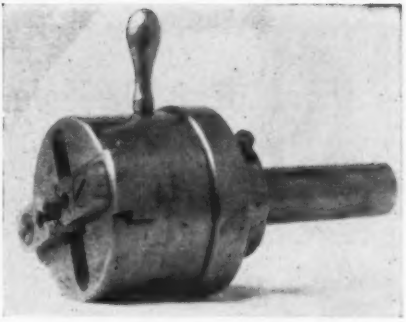


machines—made in Boston—and in 1892 there gradually emerged a loosely organized company under the name of the Geometric Drill Company.

The demand for these machines did not prove to be as overwhelming as Larrabee had predicted, however, and he grew worried about his investment. Smith finally went to William H. Swift, president of the Diamond Match Company, and persuaded him to invest $10,000 and buy out Larrabee's interest in the business.

On March 28, 1893, the Geometric Drill Co. was formally organized and incorporated under the laws of Delaware by William Swift, Joseph Swift, and William G. Pennepacker. Soon the Swifts, too, began to worry about their investment. They closed a deal with Ebenezer Beecher of the Diamond Match Co. to take over their interest. The plant was moved from Philadelphia to New Haven.

The Geometric drill was efficient for its purpose but the demand for it still was not great. The company was forced to seek a loan to carry on. To repay it a block of stock was accepted by the loaner, Frederick B. Farnsworth, then Mayor of New Haven. He brought Howard E. Adt into the company in 1896. Adt was an excellent mechanic, aggressive and intelligent.



Style "A" die head, current 1895-1902, the first type made by Geometric Tool Co. Die head was self-opening type and made in seven sizes, ranging from 3/16" to 1" inclusive.

Just prior to Adt's connection, the company had begun to make automatic self-opening dieheads and collapsing taps and other machinery for cutting screw threads. Seeing the possibilities

Geometric Circle, doing volunteer war work, 1917.





Original carpenter shop of Geometric Tool Co., 1903.

of these tools, Adt put special emphasis on them and let the impractical Geometric drill slide.

As the threading tool business grew, the name of the company as the Geometric Drill Co. became an embarrassment. Everyone thought they made drills, which was no longer true. On Jan. 9, 1905, a new company called the Geometric Tool Company was incorporated under the laws of Connecticut. They purchased the Geometric Drill Co., name, good will and all assets, and assumed their liabilities.

In 1922, Adt, in failing health, persuaded James W. Hook, president of the Allied Machinery Co. of America, to join the organization as vice-president and general manager. In 1923 Adt died suddenly, and Hook was elected president and treasurer of the company.

At the 1945 Christmas party, these employees were honored for serving the company at least 30 years. Left to right—Front row: George C. Brooks, Julien Waeckel, Francis P. King, Edith M. Buckbee, August W. Taetsch, W. Harvey Floyd. Middle row: Albert F. Breitenstein, Frederick Kisskalt, Walter B. Hitchcock, Andrew J. Johnson, George A. Denison, Frederick O. Uihlein. Back row: Charles A. Chipman, Myron E. Gold, Michael Civitello, J. Victor Arvidson, Alfonso Raccio, Charles E. Mason.



During World War II the company's volume of business was tripled and they were forced to double office and factory space. In 1944 Hook retired from active management and sold the controlling interests of the company to the Greenfield Tap and Die Corp. of Greenfield, Mass., manufacturers of a companion line of threading tools. Donald G. Millar, president of Greenfield Tap and Die, is chairman of the board of directors of Geometric. Harry L. Bill, Greenfield's vice-president and general manager, was elected president of Geometric. Hook remains as executive advisor. Geometric continues as a separate company functioning in close cooperation with the parent company.

---

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Does the work of 4 drill presses



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1956 ASTE Tool Show Will Be Largest Ever Held

RECORD-BREAKING demand for exhibit space at the 1956 Industrial Exposition, sponsored by the American Society of Tool Engineers and scheduled for Chicago's International Amphitheatre, March 19-23, has made it necessary to open the Amphitheatre's North Hall for display. Exhibitors are requesting more space this year than in any previous show with the increase averaging 12% per exhibitor. Opening of the new hall makes the 1956 Tool Show the largest ever held in the 18 years ASTE has been staging its expositions for industry. More than 40,000 registrants are anticipated.

New developments to be shown will carry out the "Tooling for Tomorrow" theme and include the latest ideas in cutting tools, ultra-fast and extreme precision machine tools and accessories, processes and workholding devices—many of them never before shown publicly to industry.

PROGRAM OF CONFERENCES

During Exposition hours, all industrial conferences will be held in Rooms A, B, and C located on the 2nd floor of the North Hall, International Amphitheatre.

NEW MATERIALS DAY, MONDAY, MARCH 19

1:30 P.M., Room A—What About Ceramic Cutting Tools?

Chairman: Wm. Cleary, Jr., shop supervisor, Caterpillar Tractor Co.

Ceramic Tooling Brought Up-to-Date, by W. B. Kennedy, chief, experimental machining branch, Rodman Lab., Watertown Arsenal. (Paper 24T1)

Cemented Borides for Tool Materials, by A. G. Metcalfe, senior metallurgist, Armour Research Foundation. (Paper RR2)

2:30 P.M., Room B—Working the "Wonder" Materials

Chairman: Wm. G. Bylsma, tool and die supervisor, Steel Case Inc.

The Drawing of Titanium, by J. S. Kirkpatrick, vice-pres., Brooks & Perkins, Inc. (Paper 24T2)

Machining with Silent Sound, by Jack Welch, mgr., machine tool div., The Sheffield Corp. (Paper 24T3)

3:30 P.M., Room C—What's New in Grinding?

Chairman: E. Ted Neubauer, senior development eng., Trane Co.

Recent Advances in Grinding Wheels, by Carl Soderlund, sales eng., Norton Co. (Paper 24T4)

Precision Production Grinding Machines, by A. H. Dall, dir. of standard machine tool eng., The Cincinnati Milling Machine Co. (Paper 24T5)

Electrical Discharge Grinding of Tools, by V. E. Matulaitis, dir. of research, Elox Corp. of Michigan. (Paper 24T6)

6:30 P.M., Commons Bldg., Ill. Inst. of Tech. —Shaped Diamond Tool Symposium Dinner

(Dinner tickets must be purchased in advance of meeting.)

Master of Ceremonies: Dr. D. J. Rettaliata, pres., Ill. Inst. of Tech.

Man-Made Diamonds, by J. S. Gillespie, mgr., diamond project, Carboloy Dept. of General Electric Co. (Paper 24T7)

RESEARCH DAY, TUESDAY, MARCH 20

9:30 A.M., Room A—Shaped Diamond Tool Symposium

Chairman: Dr. Leonid V. Azaroff, Research Physicist, Armour Research Foundation

Crystallography and Grinding Hardness of the Diamond Crystal, by Dr. J. F. H. Custers, dir. of research, Diamond Research Lab. (Paper 24T8)

The Selection, Division and Shaping of Diamond for the Manufacture of Diamond Tipped Tools, by R. G. Weavind, dir. of research, Diamond Research Lab. (Paper 24T9)

Some Aspects of the Batch Production of Diamond Tools, by N. R. Smith, dir., L. M. Van Moppes and Sons, Ltd. (Paper 24T10)

9:30 A.M., Room B—Automating the Individual Machine

Chairman: Maurice J. Ullman, chief tool eng., Swan Eng. & Machine Co.

The Tool Engineer's Function in Numerical Control, by J. Daugherty, vice-pres.-eng., Giddings & Lewis Machine Tool Co. (Paper 24T11)

The Use of Punched Cards for Machine Control, by J. J. Jaeger, vice-pres.-chief eng., machinery div., Pratt & Whitney Co., Inc. (Paper 24T12)

10:30 A.M., Room C—Machine Tool Economics—Rent or Buy?

Chairman: Carl A. Darger, owner, C. A. Darger & Assoc.

The Case for Buying Machine Tools, by George Terborgh, research dir., Machinery & Allied Products Inst. (Paper 24T13)

Economics of Replacing Machine Tools by Equipment Rental, by F. J. Trecker, pres., Kearney & Trecker Corp. (Paper 24T14)

1:30 P.M., Room A—Shaped Diamond Tool Symposium

Chairman: L. E. Doyle, mech. eng. dept., University of Illinois

Diamond Dressing of Form Grinding Wheels, by Jack Bryant, process eng., Allis-Chalmers Mfg. Co. (Paper 24T15)

Shaped Tools for Form Grinding from the Manufacturers' Viewpoint, by J. B. Speirs, chief eng., American Coldset Corp. (Paper 24T16)

Suggested Standards for Diamond Tool Shanks, by Martin Hoerer, vice-pres., Golconda Corp. (Paper 24T50)

2:30 P.M., Room B (Conference 24C1)—Plastic Tooling Challenges the Tool Engineer

Chairman: Harry J. Moffatt, supt. of tools and supplies, Caterpillar Tractor Co.

Advantages of Plastic Tooling, by Fred Lyijynen, sup., plastics development dept., auto body div., Chrysler Corp. (Paper 24C1A)

Interview Panel

John Mickey, mgr., research dept., Ford Motor Co.

Robert H. Voss, pres., Warren Plastics & Eng. Inc.

E. R. Kalis, gen. foreman, Fisher Body Div., GMC

3:30 P.M., Room C—Professional Engineering—How and Why

Chairman: Leslie C. Seager, prod. eng., Eimco Corp.

Why Register, by Paul H. Robbins, P. E., exec. dir., National Society of Professional Engineers. (Paper 24T17)

How to Become a Registered Professional Engineer, by John D. Constance, P. E. (Paper 24T18)

8:00 P.M., Beverly Room, Conrad Hilton—Tool Engineering Research in Action

Chairman: Wallace E. Carroll, pres., Simpson Electric Co.

Methods of Applying Cutting Fluids, by Prof. M. C. Shaw and Prof. P. A. Smith, machine tool lab., Massachusetts Institute of Tech. (Paper RR3)

Metal-Cutting Evaluation, by F. J. Daasch, chief machinability eng., Rock Island Arsenal Lab. (Paper 24T19)

8:30 P.M., Waldorf Room, Conrad Hilton—Solving Carbide Die Problems

Chairman: Willis G. Ehrhardt, managing partner, Ehrhardt Tool & Machine Co. (Conference Paper 24C2)

Machining Carbide Dies by the Electrical Discharge Method, by J. K. Carroll, exec. vice-pres., Electrosize, Inc.

How to Help the Die Builder Give You Satisfaction, by H. Harig, pres., Harig Mfg. Corp.

What the Strip Steel Manufacturer Should Know, by Burton E. Longwell, asst. mgr. of sales, Republic Steel Corp., sheet & strip div.

The Die Builder Asks for Help, by Don E. Oberg, pres., gen. mgr., Oberg Mfg. Co., Inc.

Application of Cemented Tungsten Carbide for Dies, by P. F. Rehner, mgr. of sales, Carmet Div., Allegheny Ludlum Steel Corp.

The Stamper and Die Building, by Thomas C. Roberts, pres., Kobzy Tool Co.

NEW PROCESSES DAY
WEDNESDAY, MARCH 21

9:30 A.M., Room A—Shaped Diamond Tool Symposium

Chairman: Adam F. Gabriel, Acme Industrial Co.

Use of Industrial Diamond and Diamond Tools in Industry, by D. J. Wallace, vice-pres., Wheel Trueing Tool Co. (Paper 24T20)

The Use of Diamond Tools for Turning and Shaping of Small Parts, by L. A. Hurwitz and R. A. Kurtz, Hamilton Watch Co. (Paper 24T21)

Application of Diamond Tools to Turning, Boring and Reaming, by Joseph Klipper, vice-pres., gen. mgr., Clipper Diamond Tool Co. (Paper 24T22)

9:30 A.M., Room B—Economical Production of Fine Pitch Gears

Chairman: Fred C. Freund, works mgr., Giddings & Lewis Machine Tool Co.

An Objective Look at the Field of Instrument Gearing, by Louis D. Martin, gear consultant, Eastman Kodak Co. (Paper 24T23)

Gears Gaging Automation, by T. S. Gates, chief eng., National Broach & Machine Co. (Paper 24T24)

10:30 A.M., Room C—Electronic Calculators and the Tool Engineer

Chairman: John R. Baker, master mech., Norge Div., Borg Warner Corp.

Introducing Computers for Machine Tool Control, by J. J. Stone, asst. chief, electrical eng. div., Battelle Memorial Inst. (Paper 24T25)

The Machinability Computer, by Dr. W. W. Gilbert, consultant, machinability development service, General Electric Co., and E. J. Weller, Carboloy Dept. of General Electric Co. (Paper 24T26)

1:30 P.M., Room A—Shaped Diamond Tool Symposium

Chairman: S. E. Rusinoff, dept. of mech. eng., Ill. Inst. of Tech.

Cemented Particle Diamond Tools, by C. Law McCabe, metals research lab., Carnegie Inst. of Tech. (Paper 24T27)

The Selection of Diamonds for Various Applications, by Dr. G. P. Freeman, D. Drukker and Zn. N. V. (Paper 24T28)

Cutting of Glass, Ferrites, Carbide and Ceramics, by Leon Van Geersdaele, Diamant Bort.

2:30 P.M., Room B—Automation and Tolerances Affect Jig and Fixture Design

Chairman: R. M. Knabe, master mech., J. I. Case Co.

Impact of High Accuracy (Low Tolerance) Requirements on Jigs and Fixtures in Mass Production, by A. V. Bodine, pres., The Bodine Corp. (Paper 24T30)

Automation—Its Effect on Jigs and Fixtures, by H. M. Adams, automation specialist, Chrysler Corp.

3:30 P.M., Room C—The What and How of Surface Finish

Chairman: R. S. Morford, tool control supt., Caterpillar Tractor Co.

A Survey of Surface Finish Inspection Techniques, by C. H. Good, prod. eng., Micrometrical Mfg. Co. (Paper 24T32)

Surface Finish and the Production Engineer, by Dr. C. R. Lewis and A. L. Thomson, Chrysler Corp. (Paper 24T33)

8:00 P.M., Room A—Automation—You Can Afford It!

Chairman: Mel Burdett, machine and tool buyer, Caterpillar Tractor Co.

Automation for the Big Production Shop, by Ralph E. Cross, exec. vice-pres., The Cross Co. (Paper 24T34)

Automated Electronics, by J. B. Cunningham, mfg. specialist, Convair Div., General Dynamics Corp. (Paper 24T35)

MANAGEMENT DAY, THURSDAY, MARCH 22

9:30 A.M., Room B—Fluid Power Today

(The National Fluid Power Association will co-sponsor a conference on fluid power for the tool engineer.)

Chairman: NFPA representative

Paper 24T36—To be announced

Paper 24T37—To be announced

10:30 A.M., Room C—Metal Cutting Research Applied

Chairman: Carl J. Oxford., Jr., research eng., National Twist Drill & Tool Co.

Crater Wear of Cutting Tools, by Prof. K. J. Trigger and Prof. B. T. Chao, dept. of mech. eng., University of Illinois (Paper 24T38)

Some Applications of Research Findings to Shop Problems, by Prof. L. V. Colwell, dept. of production eng., University of Mich. (Paper 24T39)

1:30 P.M., Room A—Training and Development of Tool Engineers

Chairman: Prof. O. D. Lascoe, dept. of industrial eng., Purdue University

The Training and Development of Tool Engineers, by Prof. O. W. Boston, dept. of prod. eng., University of Mich. (Paper 24T40)

Industry Looks at the Engineering Shortage, by T. C. Gleason, asst. chief eng., Chrysler Corp. Laboratories. (Paper 24T41)

3:30 P.M., Room B—Cost Reduction Through Product and Tool Maintenance Analysis

Chairman: Fred R. Swanson, chief commercial eng., Sundstrand Machine Tool Co.

Product Changes Improve Manufacturability, by L. D. Miles, General Electric Co.

Control of Tool Costs Lowers Production Costs, by E. Griffiths, dir. of expense control, headquarters mfg. div., Westinghouse Electric Corp.

TOOL ENGINEERING DAY
FRIDAY, MARCH 23

9:30 A.M., Room A—Designing for Tomorrow's Competition

Chairman: P. F. Dirksen, mech. eng., Weaver Mfg. Co.

Measuring Productivity in Tool Design, by Prof. A. F. Gould, dept. of industrial eng., Lehigh University. (Paper 24T44)

Planning for Tomorrow's Gaging, by Lewis O. Heinold, mgr., automatic control eng. dept., Federal Products Corp. (Paper 24T45)

10:30 A.M., Room B—Standards and the Tool Engineer

Chairman: Cyril Ainsworth, tech. dir., American Standards Assoc.

ASTE-Recommended Carbide Tool Tip Standards, by W. H. Seacord, supervision of mfg., standards research, International Harvester Co., mfg. research dept. (Paper 24T46)

The Need for Tool Steel Standards, by Dr. G. A. Roberts, vice-pres., technology, Vanadium Alloys Steel Co.

1:30 P.M., Room C—Tooling the World's Largest Presses

Tooling Problems for Utilization of Large Hydraulic Presses, by A. E. Favre, chief prod. eng., Cleveland Forge Plant, Aluminum Co. of America (Paper 24T48)

Tool Problems Peculiar to the Heavy Press Extrusion Industry, by H. J. Ross, Production mgr., Heavy Press Extrusion Plant, Kaiser Aluminum & Chemical Corp. (Paper 24T49)

2:30 P.M., Room A—Lubrication for the Tool Engineer

Chairman: Wm. Kruck, eng., Metals Lubricants Co.

Soluble Oils and the Tool Engineer, by Dr. R. K. Gould and R. C. Givens, tech. service div., research and tech. dept., The Texas Co. (Paper 24T51)

Role of Cutting Fluids in Machinery Operations, by Dr. M. E. Merchant, asst. dir. research, Cincinnati Milling Machine Co. (24T52, no paper available)

PLANT INSPECTION VISITS

Buses for all morning tours depart promptly at 8:30 A.M. from the Conrad Hilton Hotel and terminate at the International Amphitheatre.

Buses for all afternoon tours depart promptly at 1:15 P.M. from the International Amphitheatre and terminate at the Conrad Hilton Hotel. Round trip transportation is $1.50 per tour.

MONDAY, MARCH 19

1:15 P.M. Motorola, Inc. .....Tour No. 1
Visitors will see a modern plant with one of the newest and most complete conveyor systems in the country. Final assembly of all types of electronic parts, including color TV, will be seen. Limited to 200 visitors.

TUESDAY, MARCH 20

8:30 A.M. U.S. Steel Corp. (South Works) .....Tour No. 2
Tour will include the open hearth operation, Bessemers, blast furnaces, and rolling in the beam mill and the alloy bar mill. Limited to 200 visitors. No cameras permitted.

8:30 A.M. Armour Research Foundation .....Tour No. 3
Visitors will see research experiments on abrasion at high temperatures, lubrication chemistry, hot box problem for railroad bearings, development of new alloys, and research of mechanisms of vibration tools. Limited to 50 visitors. Non-U.S. citizens must register in advance with the foundation.

1:15 P.M. Armour Research Foundation.....Tour No. 4
(Repeat of Tour No. 3)

1:15 P.M. Skil Corp. .....Tour No. 5
Boring aluminum, polishing, and plating are all done in the plant. Heat treating, hobbing from straight rack gears to spiral bevel will also be shown. A new automatic washer for die cast materials is one of the features. Also, a complete punch press operation up to 150 ton capacity will be shown. Limited to 90 visitors.

WEDNESDAY, MARCH 21

8:30 A.M. Ford Motor Co. (Aircraft Engine Division) .....Tour No. 6
Largest manufacturing building under one roof—84 acres presently employing 10,000 persons. Visitors will see machining of most parts of the J-56 and J-57 engines including drilling, tapping, broaching, and grinding of "hot" parts. Limited to 100 visitors. Non-U.S. citizens will be required to clear with the air force at the plant.

8:30 A.M. Scully Jones & Co.....Tour No. 7
Visitors will see engineering department, then flow of work from steel storage completely through final assembly. During the process the following operations will be seen: Automatic turning, all phases of grinding, drilling, tapping, and milling. Also, the latest in induction heat treating. Limited to 50 visitors. No cameras permitted.

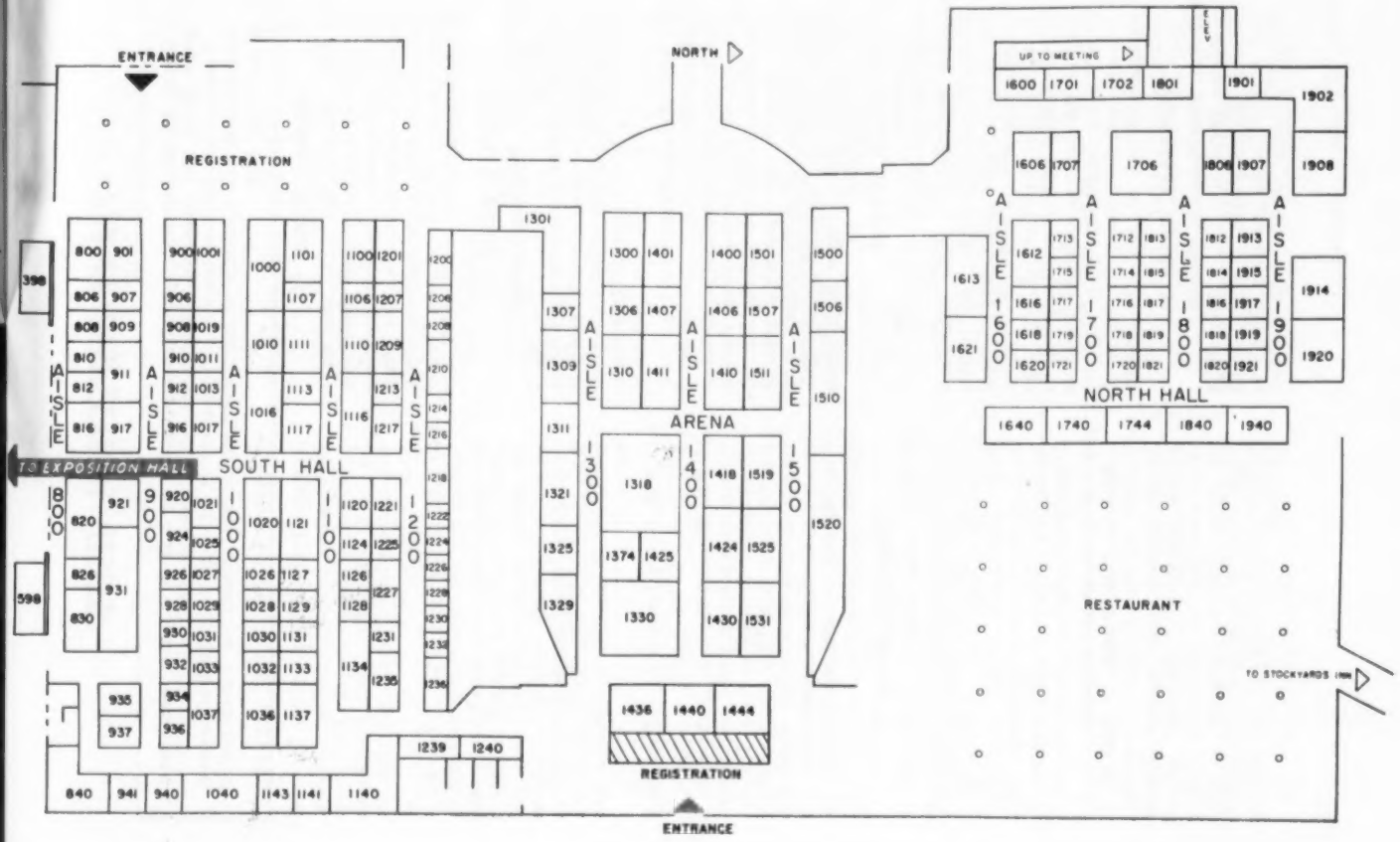
1:15 P.M. Scully Jones & Co.....Tour No. 8
(Repeat of Tour No. 7)

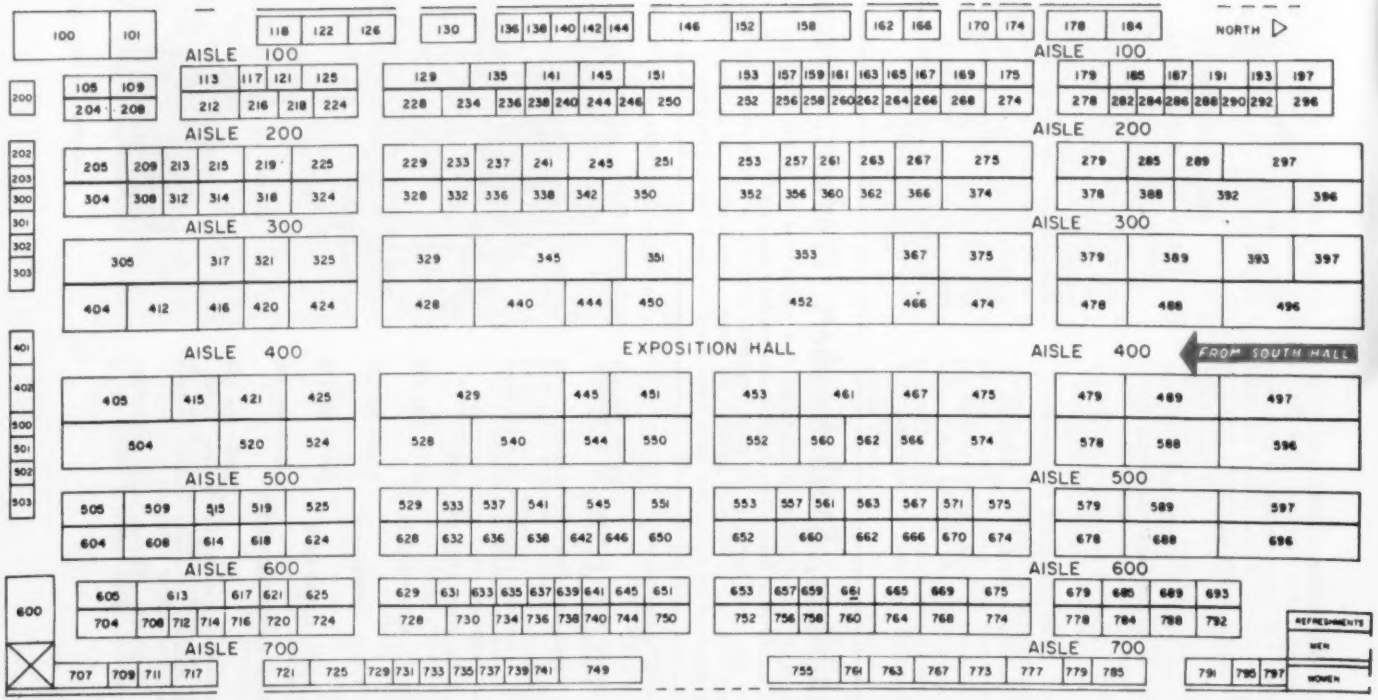
1:15 P.M. Hotpoint Co. .....Tour No. 9
Visitors will see the range, refrigerator, and laundry machine sections. Top output for any appliance is one every twenty seconds. Geared for rapid machining in all phases. Limited to 200 visitors. Non-U.S. citizens require state department clearance.

THURSDAY, MARCH 22

8:30 A.M. Kropp Forge Co.....Tour No. 10
In the country's largest job forging shop visitors will see the following: research metallurgical laboratory; flat die, drop forge and upset forging operations; modern heat treating equipment; final inspection. Limited to 125 visitors. No cameras permitted.

1:15 P.M. International Harvester (Melrose Park Works).....Tour No. 11
Visitors will see all types of machining on six different diesel engines. This includes automation equipment for all types of operations. Machining is done on many different materials, in some cases with the same tooling. Limited to 50 visitors. U.S. citizens only. No cameras permitted.


ENTRANCE
NORTH
REGISTRATION
UP TO MEETING
ELEV.
1600 1701 1702 1801 1901 1902
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AISLE 1700
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AISLE 1200
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ENTRANCE


NORTH
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AISLE 200
AISLE 300
AISLE 400
AISLE 500
AISLE 600
AISLE 700
EXPOSITION HALL
FROM SOUTH HALL
REFRESHMENTS
MEN
WOMEN

1:15 P.M. Electromotive Division (General Motors Corp.) .....Tour No. 12
Visitors will see manufacturing operations at the LaGrange Plant including machining of component parts for diesel engines, electrical and diesel sub-assembly divisions and the final assembly of diesel electric locomotives with emphasis on interesting applications of tooling. Included are sections where units for oil field and stationary power are manufactured. Limited to 200 visitors.

1:15 P.M. Sears Roebuck & Company (Merchandising, Testing & Development Labs.) .....Tour No. 13
Visitors will see products purchased by Sears tested completely. This program includes testing and tearing down major appliances, machinery and numerous mechanical devices. In addition most items competitive to those which they buy are rigidly checked. All makes of tools are constantly being tested for performance, etc. Limited to 50 visitors.

FRIDAY, MARCH 23

8:30 A.M. Verson Allsteel Press Corp.....Tour No. 14
Visitors will see under one roof, 500,000 sq. ft. of one of the most modern press and tooling manufacturing facilities in the world. Burning and welding operations, milling, boring, planing, and gear cutting operations required to produce presses ranging from 60 to 28,000 tons will be shown. Also to be seen in operation will be a new research and development center, currently developing new processes in the field of cold extrusion. Limited to 200 visitors.

Exhibitors, Booth Numbers, Products, Personnel

This is a partial listing of machines and accessories to be demonstrated at the ASTE Industrial Exposition. In all instances only one machine is illustrated, which does not mean that it is the most important machine to be presented by the company, or that it is the only machine on display. All products on which information was received by press time have been listed on the following pages.

AA GAGE COMPANY
Detroit, Mich.
Booth No. 121
Personnel: B. W. Schabot, N. B. Michie, E. J. Peters, N. G. Miller

New Products: Panto-Marker precision marking machine; precision indexing fixture; cylindrical and rectangular gage blocks; magnetic cylinder square; taper hole checker; precision parallels.
Other Products: Ball micrometers

ACE DRILL BUSHING CO. INC.
Los Angeles, Calif.
Booth No. 175

ACE DRILL CORPORATION
Adrian, Mich.
Booth No. 233

ACME STEEL COMPANY
Chicago, Ill.
Booth No. 178

ACME TOOL COMPANY
New York, N.Y.
Booth No. 402

ADAMAS CARBIDE CORP.
Kenilworth, N.J.
Booth No. 145
Personnel: Edward L. Dreyer, pres.; Frank W. Hogan, sales mgr.; Clark B. Frothingham, midwest sales; Albert Fisher, director of research.

New Products: Dex-A-Tool toolholder for carbide throw-away inserts.

A. A. Gage Panto-Marker.





Almco Supersheen submerged finishing barrel.

ALAMEDA GAGE CO.
Oak Park, Mich.
Booth No. 1720
Personnel: L. E. Hanton

ALEMITE DIVISION STEWART-WARNER CORP.
Chicago, Ill.
Booth No. 1216

ALLEGHENY LUDLUM STEEL CORP.
Pittsburgh, Pa.
Booth No. 585

ALLEN TOOL COMPANY DIV. ALLEN INDUSTRIES, INC.
Springfield, Ohio
Booth No. 729

ALMCO SUPERSHEEN, DIV. OF QUEEN STOVE WORKS, INC.
Albert Lea, Minn.
Booth No. 704
Personnel: R. C. Trow, vice-pres.-gen. mgr.; O. D. Ladley; J. C. Johnson; Jim Bublitz.
New Products: Automated submerged finishing barrels; complete line of 1956 barrel finishing equipment; new compounds and other abrasive medium.

ALPHA MOLYKOTE CORPORATION
Stamford, Conn.
Booth No. 303

AMERICAN CAM COMPANY, INC.
Bloomfield, Conn.
Booth No. 529

AMERICAN COLDSET CORP.
Paterson, N.J.
Booth No. 205
Personnel: J. P. Lunzer; S. F. Mule; J. B. Speirs.
New Products: Diamond tools; diamond wheels; diamond core bits; diamond form tools for use on Hoglund, Jones & Lamson, Ex-Cell-O and Diaform dressers embodying new M28 setting.

AMERICAN CYSTOSCOPE MAKERS
New York, N.Y.
Booth No. 285

AMERICAN DRILL BUSHING CO.
Los Angeles, Calif.
Booth No. 428

AMERICAN HERFORDER CORP.
Chicago, Ill.
Booth No. 619

AMERICAN MACHINE & FOUNDRY WAHLSTROM/FLOAT-LOCK AND LOWERATOR DIVISIONS
New York, N.Y.
Booth No. 153

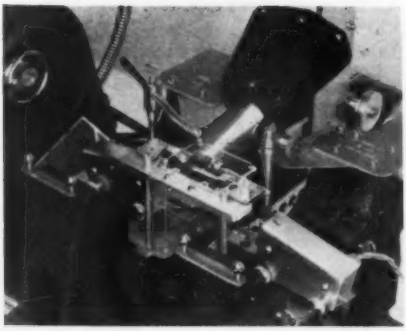
AMERICAN POSITIVE GRIP
Willimansett, Mass.
Booth No. 1715
Personnel: T. Barowsky

AMERICAN PULLMAX CORP., INC.
Chicago, Ill.
Booth No. 689
Personnel: E. G. Kihlstrom, sales mgr.; L. W. Behrendt, asst. sales mgr.; O. T. Hammer, eastern rep.; J. J. Thomas, Ohio rep.; R. R. Nehf, Illinois rep.; J. F. Steger, Illinois rep.; S. Oberg, service engineer.
New Products: Pullmax Models P-5 and P-7 universal shearing and forming machine; Pulmax trimmer. The Model P-7 has these improved features: strengthened frame; 8-speed mechanism with stroke lengths ranging from .059 to .244; simplified adjustment of cutting tools; edge cutting capacity of 9/32" mild steel.

AMERICAN SIP CORPORATION
New York, N.Y.
Booth No. 405
Personnel: T. R. Rudel; J. B. Riley; R. C. Muller; Paul Gloor; Eric Gees; Fred Bietenhader; Miss T. Casperson.
New Products: First showing of Hydroptic-8P jig borer.
Other Products: 3-K jig borer; Hydroptic-6 jig borer; measuring equipment.

B. C. AMES COMPANY
Waltham, Massachusetts
Booth No. 934

AMPCO METAL, INC.
Milwaukee, Wis.
Booth No. 204
Personnel: J. P. Henry, gen. sales mgr.; R. J. Severson, asst. gen. sales mgr.; O. B. Frohman, consulting eng.; Elmer E. Whitson, adv. mgr.; Gordon Brown, dist. sales mgr., Wis.; Robert Louthain, dist. sales mgr., Chicago; Wm. Taff, dist. sales mgr., Indianapolis; Ralph McLaughlin, sales eng.
New Products: Standard mill and foundry products with Grade 24 stock die blanks; Grade 18 solid extruded rounds; centrifugally cast standard bars in 12½" lengths; "as cast" guide post bushings; Grade 8 metal, sheet and plate.
Other Products: Metal series of hard grades—(21, 22, 24) as forming dies with examples of parts and units formed over them; castings, wrought products and machined parts of other grades (8, 12, 16, 18, 20) of Ampco metal; Ampco-Weld resistance welding electrodes and accessories; bronze welding electrodes.



Annis new Model M2-S-40/AA Dynograph balancing machine.

ANDERSON OIL CO. INC., F. E.
Portland, Conn.

Booth No. 467

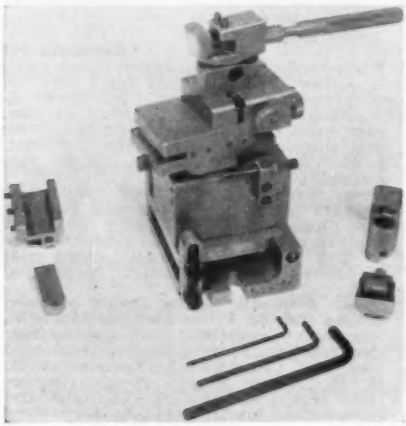
Personnel: A. C. McCamant, div. mgr.; R. E. Hellyer, service eng.; E. A. Bejcek, sales eng.
New Products: Unikool—soluble cutting fluid combining oil and water into a transparent and soluble solution.
Other Products: Lusol all chemical coolant for metalworking; K-7 grinding compound, a transparent grinding solution for all metals.

ANNIS CO., R. B.
Indianapolis, Ind.

Booth No. 1214

Personnel: R. B. Annis; Mrs. R. B. Annis; M. B. Annis; R. K. Caskey; H. A. Franz; L. E. Daniel; R. S. Zinn.
New Products: New Model M2-S-40/AA Dynograph balancer, for very small rotors. Work supporting fixture is very lightweight so as to hold parasitic mass to a minimum. This promotes high relative sensitivity for small rotors. Rotors weighing a small fraction of an ounce can be balanced on a production basis.
Other Products: Standard Model M2-S-40 Dynograph balancer; split core current transformers; electric etchers; demagnetizers.

Apex general purpose radius grinding fixture.



APEX TOOL & CUTTER CO., INC., THE
Shelton 14, Conn.

Booth No. 174

Personnel: F. G. Glover; Paul Johnson; F. J. Wilson; F. J. Wilson, Jr.
New Products: Double-locking shankless serrated adjustable holders and tools—permit extra heavy roughing work on planers with the use of the button-type carbide plug, which can be indexed for use of new cutting edges before regrinding; general purpose radius grinding fixture, which allows for redressing tools. Adapter heads for holding the shankless, round shank or square tool bits are interchangeable on the fixture by removing one screw only. This fixture can be used on any tool and cutter grinder that has infeed.
Other Products: Standard and special tool holders, both serrated adjustable and round shank style; tool bits of drop forged high speed and cobalt steel; carbide tipped tools; single and multiple purpose milling cutters with tapered serrated blades drop forged of high speed or cobalt steel; carbide tipped milling cutters; railroad tools for axles, wheels, etc.

ARMOUR RESEARCH FOUNDATION
Chicago, Ill.

Booth No. 504

Personnel: Niels C. Beck

ARMSTRONG BROS. TOOL CO.
Chicago, Ill.

Booth No. 1324

ARO EQUIPMENT CORP.,THE
Bryan, O.

Booth No. 638

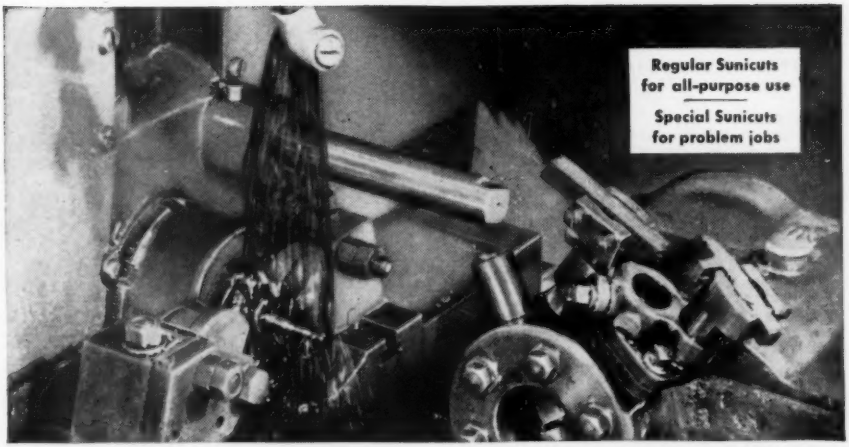
Personnel: E. L. Jackson; G. R. Voigt; M. E. Rutz; L. O. Barrett; B. O. Stoothoff; J. Lombardi; O. D. Hitt; W. B. DeGroff.
New Products: Par-A-Matic drill, in single and multiple setups; Multiple-spindle semi-automatic nut runner.
Other Products: Air hoists; automatic drills.

ARROW TOOL & REAMER CO.
Detroit, Mich.

Booth No. 645

ARWOOD PRECISION CASTING CORP.
Brooklyn, N.Y.

Booth No. 661



To assure peak production . . .

THERE'S A SUNICUT OIL FOR EVERY SCREW MACHINE OPERATION

Today's Sunicut cutting oils result from years of research and on-the-job testing. And they're versatile, too. In many plants *all* screw machine jobs are handled by *one* Sunicut grade.

For the problem jobs, Sun makes a wide variety of special Sunicut oils, each designed to do the job better.

Your Sun representative has the practical know-how to analyze *your* problems. With Sun's experienced engineers, he's ready to help you pick a Sunicut oil that will give you tolerances and finishes you want.

The Sunicut series for screw machines is only part of a large selection of non-emulsifying and emulsifying cutting oils made to help you get peak production at the lowest possible cost.

For complete information about Sun cutting oils see your Sun representative...or write Sun Oil Company, Philadelphia 3, Pa., Dept. MT-3.

SUNOCO®

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY
Philadelphia 3, Pa.

IN CANADA: SUN OIL COMPANY, LTD., TORONTO AND MONTREAL

Encircle No. 299 on Card, Opopsite Page 65

AUSTENAL LABORATORIES, INC.
New York, N.Y.

Booth No. 916

AUSTIN INDUSTRIAL CORP.
White Plains, N. Y.

Booth No. 550

Personnel: M. J. Bloch; Cy L. Tebbetts; Nils Ohlsson; John Beck.

New Products: SAJO vertical miller Model VF-54. This Swedish-made miller is of the standard duty, high speed type, has longitudinal, transverse and vertical feeds and power rapid traverse in all directions. All sliding surfaces are hand-scraped. Table working surface is 47¼"x11". Longitudinal power feed is 33½". Transverse and vertical travel are respectively 12" and 18".

Other Products: Sajo standard duty miller; Sajo light duty millers; VMA shapers, 18", 22", and 26" strokes.

BMT MFG. CO.
Elmira Heights, N.Y.

Booth No. 709

Personnel: D. A. Mosher, pres.; F. W. Soper, process eng.; Alfred Austin, sales eng.; K. P. Tota, development eng.; K. C. Mosher, sales eng.; A. H. Pulkinen.

New Products: Multi-barrel slide-honing machine. Controlled-motion honing does not affect the dimensional tolerances of the workpiece. Removes burrs, flash, tool marks, rust, etc.

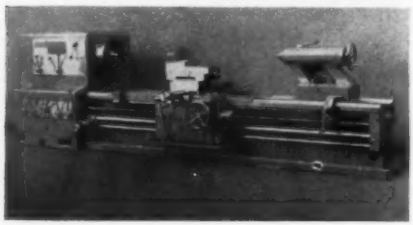
BACHMANN CO., INC., ERIC R.
Long Island City, N.Y.

Booth No. 1301

Personnel: Eric R. Bachmann, pres.; M. Bachmann, vice-pres.; Kurt R. Picard, secy-treas.; Hubert C. Feder, engineer.

New Products: Loewe optical profile grinder; Weiler 1" turret lathe; Schlenker 33½" shaper; Gutberlett automatic cut-off saw; Herminghausen centerless grinder SR-1, ¾" capacity; Kuhlmann tool and cutter grinder. The Model SP optical profile grinder, for the form tool grinding of flat and circular form tools, of sectional dies and punches, gages and templates, features a 20"x20" Shadowgraph screen with two magnifications of 25X and 50X. The grinding wheel slide has a stroke of 3-5/16" and allows adjustments for lateral relief angles of ±15° and axial relief angles up to 35°.

Other Products: Piltz threading and gaging tools; Gauthier fine pitch spur gear hobbing machine.



Barer Model MVI extra heavy duty lathe.



Barker Dual-Mill.

BAKELITE CO.
New York, N.Y.

Booth No. 397

Personnel: Russ Matthews

BALANCE ENGINEERING CO.
Chicago, Ill.

Booth No. 1111

BANNER WELDER, INC.
Milwaukee, Wis.

Booth No. 763

Personnel: David Uihlein; Art Kranitz; Floyd Avery; Don Borschel; Fred Van Vooren; Al Lovato.

New Products: Special cylinder forming seam welder.

Other Products: Projection welder.

BARER ENGINEERING & MACHINERY CO., LTD.
Montreal, Canada

Booth No. 1424

Personnel: A. Barer, pres.; R. Goedde,

Tool Grinders

EX-CELL-O

XLO
EX-CELL-O for PRECISION

FOR CARBIDES—
CAST ALLOYS—
HIGH-SPEED STEELS

Ex-Cell-O's complete line of tool grinders sharpen single-point tools efficiently and economically. All are double-end models. All use cup-type wheels and have large easy-to-adjust tool rest tables.



There's an Ex-Cell-O Grinder to suit the needs of every shop, large or small. For data on Ex-Cell-O's complete Tool Grinder line, write to Detroit, or call your local Ex-Cell-O representative.

Style 44-A Ex-Cell-O Precision Carbide Tool Grinder is one of the newest models. With inbuilt motor precision spindles, and ample coolant pressure flow, it does fast work on a wide range of tool sizes.

EX-CELL-O
CORPORATION
DETROIT 32, MICHIGAN

55-7

MANUFACTURERS OF PRECISION MACHINE TOOLS • GRINDING SPINDLES • CUTTING TOOLS • RAILROAD PINS AND BUSHINGS • DRILL JIG BUSHINGS • AIRCRAFT AND MISCELLANEOUS PRODUCTION PARTS • DAIRY EQUIPMENT

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Beaver Quick Change holder.

engineer; C. A. van Kuppeveld, engineer; E. H. Peschl, sales rep.; C. Evans, sales engineer.

New Products: Heavy duty lathe Model MIIA; extra heavy duty lathe Model MVI; Kaeser universal grinder Model B.75/R. The Model MVI has 18 spindle speeds, 8-400 rpm; rapid traverse in six directions.

Other Products: Toolroom lathe Model M.O.; drill press Model SEP.4; Almhult 20" shaping machine; Prema 13" shaping machine.

BARKER ENGINEERING CO.
Cleveland, O.

Booth No. 731

New Products: Model A.M. ¾ hp. heavy duty mill, weighing about 500 lb.; Dual-Mill, equipped with two enclosed 1/3 hp. motors. Variable speed drive makes it possible to run either spindle at different speeds to accommodate the proper cutter for the milling operation desired.

Other Products. Standard 1/3 hp. bench mill. This versatile mill features 3-way travel for the production milling of small parts.

BARNES DRILL COMPANY
Rockford, Ill.

Booth No. 1127

New Products: Line of High Production honing tools and abrasives—direct body support of stone near the cutting face, full support of the expansion pressure to the stone: Two Stage combination filter—magnetic drum attracts and removes the major contaminant load, and fabric filtering media remove the remaining foreign material to provide a high degree of coolant clarity; magnetic coolant separator.

BARRY CONTROLS INC.
Watertown, Mass.

Booth No. 167

E. A. BAUMBACH MFG. CO.
Chicago, Ill.

Booth No. 1027

BAUSCH & LOMB
Rochester, N.Y.

Booth No. 1032

Personnel: G. Lewis

BEAVER TOOL AND ENGINEERING CORP.
Royal Oak, Mich.

Booth No. 444

New Products: Quick Change tools; Eager Beaver milling cutters. The display will include an installation of a Quick Change holder in a machine spindle to show that the holder does not impair the accuracy of any machine tool. Milling cutters are furnished with inserted type carbide-tipped blades, secured in place by a plain wedge which permits infinite adjustment of blades. One cutter can be used for cutting all types of material by merely changing to the right carbide blade.

BECKETT-HARCUM CO.
Wilmington, Ohio

Booth No. 545

Personnel: Don Beckett; Wm. Beckett; Don Williams; Bates Harcum; Jim Kemper; John Warren; Jack Carr; Ed Anderson; Jack Jurgens.

New Products: Air and hydraulic valves; index table.

Other Products: Drill press feed, drilling and tapping machines.

BENDIX-WESTINGHOUSE AUTOMOTIVE AIR BRAKE CO.
Elyria, Ohio

Booth No. 537

BESLY-WELLES CORP.
Beloit, Wis.

Booth No. 637

Personel: Everett Addams, vice-pres., sales; M. L. Higgins, sales mgr., Metro div.; John Minton, mgr., Metro div.; Jack Teare, Bernard F. Wojick, James Shallcross, engr. dept., Metro div.; Ellis C. Wester, Ted Mummery, district mgr.

New Products: Besly-Metro standard and special carbide tipped tools.

Other Products: Besly-Metro gages.

BLACK & WEBSTER, INC.
Newton, Mass.

Booth No. 258

Personnel: E. A. Black; F. G. Webster; W. L. Grinnell.

New Products: All-electric indexing table; auto. cut-off machine.

Other Products: Solenoid-operated electric impact hammers.

BLAKE CO., INC., EDWARD
West Newton, Mass.

Booth No. 261

Personnel: Edward Blake, pres.; G. D. Bennett; A. W. Chester.

New Products: Worcester drill grinder; Black Diamond drill grinder; flute grinder; tap chamfer grinder; surface finish standards.



WHY GROWL . . .

. . . OVER YOUR GRINDING WHEEL PROBLEMS? You'll solve them easily when you switch to CINCINNATI (PD)° GRINDING WHEELS. Because *now* CINCINNATI Grinding Wheels offer POSITIVE DUPLICATION—the most talked about development in years. Positive Duplication is a remarkable achievement in precision manufacturing and quality control that can *save you money . . . and increase your production.*

Through the CINCINNATI (PD) Manufacturing Process you are assured Positive Duplication of the original wheel *every* time you reorder. "On grade" with a CINCINNATI (PD) WHEEL means all future (PD) WHEELS will act and grind exactly alike.

Yet CINCINNATI (PD) WHEELS are priced no higher than ordinary wheels.

Let us sink our teeth into your grinding wheel problems and we'll have you purring like a kitten. Contact us and we'll send one of our representatives—men who know grinding and grinding machines as well as grinding wheels. Write, wire or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio. Remember . . . *only* CINCINNATI Grinding Wheels give you . . .

(PD) POSITIVE DUPLICATION

°Trade Mark Reg. U. S. Pat. Off.

CINCINNATI°
Grinding Wheels
A PRODUCTION-PROVED PRODUCT OF THE CINCINNATI MILLING MACHINE CO.

Encircle No. 301 on Card, Opposite Page 65

BLISS COMPANY, E. W.
Canton, Ohio

Booth No. 505

Personnel: J. H. Tredinnick, R. Potter, exec. vice-pres.; E. A. Irwin, vice-pres., gen. sales mgr.; C. A. Chamberlain, secy.; J. T. Harrington, asst. secy.; C. J. Theken, div. mgr.; B. E. Meyer, gen. service mgr.; D. E. White, adv. mgr.; E. V. Ferry; J. Bushong; W. Powell; S. Nerko; J. Primeau; R. Gullberg; H. Schrowl; E. Thomas; E. Howell; J. Cocker.
Products: Die sets; die supplies.

BOICE GAGES, INC.
Staatsburg, N.Y.

Booth No. 932

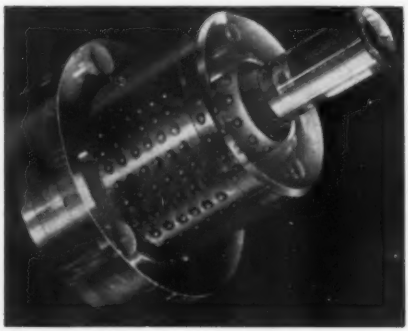
Personnel: Ralph Boice, pres.; Loyd Bigelow, vice-pres.; Ray Danese, Sr., vice-pres., sales; Ray Danese, Jr., sales eng.; Wm. Livingston, asstl sales mgr.; Carl Sage, vice-pres., mfg.
New Products: Fully adjustable dial bore gage Setmaster; heavy duty snap gage; bore gage, ¼" to ½" capacity.
Other Products: Dial bore gages and adjustable masters; dial snap gages and adjustable masters; large diameter shallow depth gages and masters; depth gages and adjustable masters; length gages and adjustable masters.

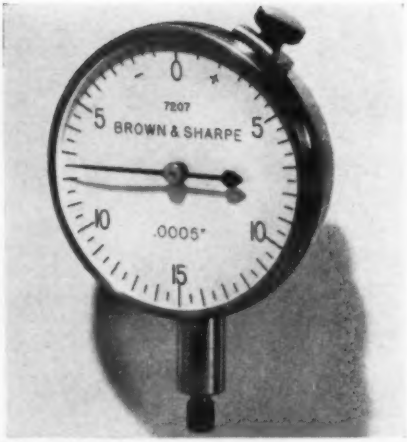
BOKUM TOOL COMPANY
Detroit, Mich.

Booth No. 136

Personnel: F. Heuser, pres.; H. C. Heuser, tool eng.; W. R. Fiedler, Ralph Schirmer, Tony Gorski, George Fish, W. H. Slaght, Clem Kruse, Bill Kruse, John Warmus, M. A. Siebert, Herb Lenk, Wm. Scheer, Louis Slager, Otto Mueller, L. R. Lance, Jr., sales rep.
New Products: O ring and retaining ring grooving tools in high speed steel and carbide tipped; extended line of swing tool holders for screw machines and turret lathes.
Other Products: Boring tools in high speed steel and carbide tipped; solid carbide boring tools; short neck boring tools and tool holders; resharpening fixtures.

Briney Size-Positive boring quills.





Brown & Sharpe dial gage.

BOYAR-SCHULTZ CORP.
Broadview, Ill.

Booth No. 1510

Personnel: Frank Korte, pres.; Wm. Bunnell, factory mgr.; W. J. Sullivan, vice-pres.-sales mgr.; Mike Sieverson; A. Watters; C. Dussmann; C. Rieger; R. Michels; W. E. Jackson; H. Hartley; R. Miller .
New Products: 6x18 hydraulic grinder; 6x18 hand feed; Hydra-Lite hydraulic bar feed; 6x12 hydraulic grinder.
Other Products: Profile grinders; surface grinders; screw machine tools; copper head laps; T slot bolts; lead screw tapping attachment.

BRIDGEPORT MACHINES INC.
Bridgeport, Conn.

Booth No. 1507

BRINEY MFG. CO.
Pontiac, Mich.

Booth No. 159

New Products: Size-Positive boring quills. Bushing is mounted on preloaded ball bearings between the flange and boring bar. The hole in this bushing is eccentric with its outside diameter. Boring bar is driven by the flange which is locked to the bar by an integral pin and lock nut unit. Inertia and spring tension on the bushing prevent slippage when starting or stopping the quill. Tool adjustment without loosening or tightening any part is accomplished by rotating the bushing with a spanner wrench.

THE BRISTOL COMPANY
Waterbury, Conn.

Booth No. 541

New *Fluid Feed* AIR-HYDRAULIC DRILL PRESS FEED!

Combines Steady Even Hydraulic Control with Economical Dependable Air Power!



with *Predictable* Speed Control

Learn how Mead's new oil-flow principle adjusts feed rate accurately 2 to 60 inches per minute—other superior features. Write factory or nearest Mead Man for folder plus Catalog of Mead units suitable for automation with it!

MEAD
SPECIALTIES COMPANY
4114 N. Knox Ave., Dept. YA-36
CHICAGO 41, ILLINOIS

PATHFINDER IN AIR POWER AUTOMATION

Encircle No. 302 on Card, Opposite Page 65

BROWN & SHARPE MFG. CO.
Providence, R.I.

Booth No. 374

New Products: Dial gages, an expanded line of 47 styles and sizes, featuring gages with plain and jeweled bearings and shockless types; Hite-Chek, a holding post with fine adjustment to accurately transfer precision settings; bench centers, economical small size for use where work does not exceed 18" in length; permanent magnet chucks, two rectangular models, 5"x10" and 6"x18"; 1" micrometer, reads by ten-thousandths as well as thousandths of an inch; rolling mill caliper gage, drop-forged to withstand severe use in measuring sheet iron and steel in rolling mills; Tri-Cal universal vernier caliper, a tool which takes outside, inside, or depth measurements to thousandths of an inch; double end end mills, fast-cutting designs of different diameters at each end of shank.

Other Products: Precision tools; milling cutters and arbors; electronic measuring equipment; screw machine tools, permanent magnet chucks and pumps.

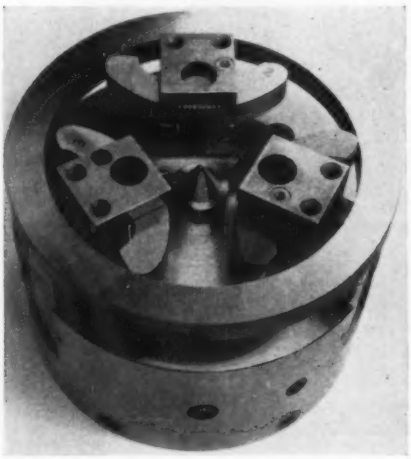
BRUNING CO., INC., CHARLES
Chicago 41, Ill.

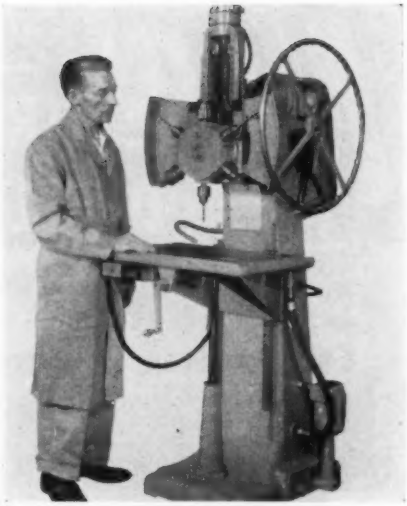
Booth No. 1001

Personnel: J. C. Calkins; Kenneth Beach; Norman Garneau; Joseph Owens; Al Puccetti; Irving Hawley; Virgil Murphy; Wm. Carr; Ross Cornelius; Michael O'Shea; Arthur Harlan; Bob O'Connor; Cliff Jelinski; Howard Long.

New Products: Optical tooling instruments and concept; Model 510 Copyflex machine; Model 250 Copyflex machine.
Other Products: Hamilton Auto-Shift drafting table; counter balance drafting machine; electric erasing machine; circular drawing machine; Bruning technical illustration templates.

Buck Tool compensating chuck.





Burgmaster Model 1C turret drill.

BRUSH ELECTRONICS COMPANY
Cleveland, Ohio

Booth No. 1017

BRYANT CHUCKING GRINDER CO.
Springfield, Vt.

Booth No. 901

BUCK MFG. CO.
Los Gatos, Calif.

Booth No. 1801

Personnel: V. K. Lund

BUCK TOOL CO.
Kalamazoo, Mich.

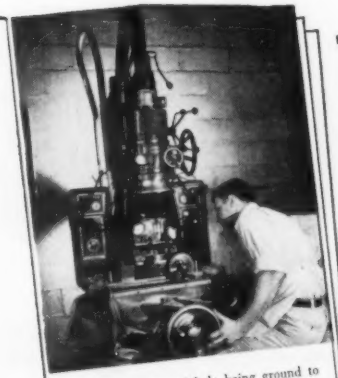
Booth No. 650

Personnel: Russell Buck; Jim Buck; Dick Milham; Ted Kinney; Lee Barker.
New Products: Compensating chuck with true equalization, accomplished by reducing friction and simplifying the number of parts that compensate. Easily changed from one diameter to another. It will operate equally well with the machine running or stopped, allowing automatic loading and unloading. The compensating mechanism increases the gripping power, permitting more rapid stock removal. The center can be set dead true. Chuck can also be used as a standard power chuck when required.
Other Products: Scroll, independent, and power chucks.

BUCKEYE TOOLS CORP.
Dayton 1, Ohio

Booth No. 113

Personnel: H. O. Gummere, vice-pres.-gen. mgr.; E. B. Meynard, gen. sales



NEW YORK

"An irregular-shaped hole being ground to within .0002" on the No. 2 Moore Jig Grinder. The machine can do contour grinding of almost any size and shape."—*from facilities booklet of August W. Holmberg & Co., Inc., Flushing, N. Y.*



MISSOURI

"Two No. 2 Moore Jig Borers...permit Ehrhardt to locate and bore holes accurately and to inspect the finished work."—*from facilities booklet of Ehrhardt Tool and Machine Co., St. Louis, Missouri.*

"FACILITIES, FACILITIES, FACILITIES..."

How Leading Tool and Die Shops Across the Nation Feature MOORE Jig Borers and Jig Grinders

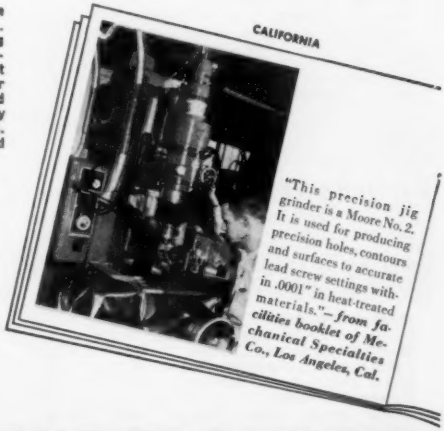
Today, top contract tool and die shops often rely on illustrated booklets to sell prospects on their facilities. And they often rely on pictures of their Moore Jig Borers and Jig Grinders to indicate the degree of precision work they can do. It's particularly significant that leading contract shops choose Moore machines for "double duty"—in the toolroom and on the printed page—for these owner-managed firms are understandably deliberate and judicious in selecting machine tools. Write today for detailed bulletins on Moore's top-billed toolroom teammates.

MOORE SPECIAL TOOL COMPANY, INC.
728 Union Avenue, Bridgeport 7, Connecticut



See an important new MOORE machine at ASTE Booth 1430

HOLES, CONTOURS AND SURFACES
Moore's *all-new* book tells you how to produce tools, dies and precision parts *the modern way*. 424 pages, 495 illustrations. $5 in U.S.A., $6 elsewhere.



CALIFORNIA

"This precision jig grinder is a Moore No. 2. It is used for producing precision holes, contours and surfaces to accurate lead screw settings within .0001" in heat-treated materials."—*from facilities booklet of Mechanical Specialties Co., Los Angeles, Cal.*

ADD MOORE TOOLS TO YOUR TOOLROOM

JIG BORERS • JIG GRINDERS • PANTO-CRUSH WHEEL DRESSERS • PRECISION ROTARY TABLES • HOLE LOCATION ACCESSORIES

Encircle No. 303 on Card, Opposite Page 65

mgr.; R. V. Shaffer, field sales mgr.; Geo. Mitchell, sales rep.; H. W. Irwin, Mason H. Lytle, Harry Leighton, Hugh Harris, Ed. Leighton, field sales rep.
New Products: Buckeye X-4 abrasive tools; vertical grinders and sanders; horizontal grinders and buffers. These tools develop greater horsepower, maintain higher speeds under load, yet are identical in size and weight to previous models of same tools.
Other Products: Nutrunners; screwdrivers; drills; shears; nibblers; wrenches; air motors; pumps; high frequency electric tools, including drills, screwdrivers, grinders, sanders, polishers.

BURG TOOL MFG. CO., INC.
Gardena, Calif.
Booth No. 359

New Products: Model 1C Burgmaster turret drill, designed as a smaller, faster unit. It handles holes up to 3/8" in steel, has a 7" stroke and a speed range of 325-4050 rpm. Can do any combination of six operations in one setup.
Other Products: Burgmaster turret drill Models 3BH—8-spindle automatic hydraulic, 2BR—6-spindle ram type radial drill, 2B—6-spindle hand operated; Burgmaster accessories; Tool-flex line of full floating tool holders. As an added note of interest, Model No. 1, Burg Tool's first production machine, will be on display.

CADILLAC STAMP CO.
Detroit, Mich.
Booth No. 212

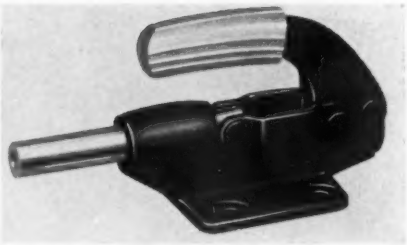
Personnel: F. Krembel; R. Schutt; A. T. Mullen; C. Nelsen; F. Armstrong; R. Heulsman; P. Kempf; E. H. Novak; D. Elliott; E. Schuerer.
New Products: Special No. 54 hydraulic marking machine with semiautomatic tooling; No. 52 air impact press with air operated slide mechanism; Parker micrometer screw stop.
Other Products: Standard No. 54 hydraulic marking machine; No. 52 tag marker, hand operated; special marking dies, hand and machine type holders; automatic numbering heads.

CAMMANN MFG. CO.
Cleveland, O.
Booth No. 140

Personnel: F. W. Cammann

CAPEWELL MFG. CO., THE
Hartford 2, Conn.
Booth No. 1141

Personnel: Wm. C. Heard, domestic sales mgr.; W. J. Craven, engineer; John Dwyer, sales rep.; Eben N. Brown, Chicago warehouse mgr.; W. E. McCullough, sales rep.; A. J. Mooney, sales rep.
Products: Band saws; hand and power hack saws; pipe fitters' hand tools; hammers; ground flat tool steel.
New Products: Safetech hand hack saw blade; power hack saw machine demonstrating cutting performance of Capewell Technite; high speed and Safetech power hack saw blades.



Case-Maul push-pull toggle clamp.

CARBOLOY DEPARTMENT OF GENERAL ELECTRIC CO.
Detroit, Mich.
Booth No. 1318

Personnel: K. R. Beardslee, gen. mgr.; J. E. Weldy, marketing mgr.; C. E. St. Thomas, adv. and sales promotion mgr.; F. J. Staroba, carbide sales and product services mgr.; G. M. Chandler, marketing administration mgr.; F. M. Mansfield, product planning mgr.; J. A. Muldoon, Michigan district sales mgr.; A. M. Thomson, East Central district mgr.; H. H. Jason, Midwestern district mgr.
New Products: Milling grade carbide; cutting tool grade carbide; cemented oxide tool tips.
Other Products: Cemented carbide cutting tools; carbide wire drawing dies; carbide blanking, drawing, forming and piercing dies; cemented carbide blanks; tool holders; wear proofing applications; cemented carbide tools; vacuum melted metals; Thermistors; Thyrite Varistors.

THE CARPENTER STEEL CO.
Reading, Pa.
Booth No. 1310

CARTER CONTROLS, INC.
Lansing, Ill.
Booth No. 636

Personnel: J. C. Miller; R. E. Thompson; G. L. Smith; Harlan Davis.
New Products: Rotary actuator.
Other Products: Pneumatic and hydraulic cylinders, valves and accessories.

CASE-MAUL MFG. CO., INC.
Mansfield, Ohio
Booth No. 635

Personnel: Louis W. Case, vice-pres.; John C. Maul, secy.-treas.; Paul Carr, asst. plant mgr.; Wm. H. Maul, plant mgr.
New Products: Push-pull type toggle clamps.
Other Products: Red Head toggle clamps.

CASH COMPANY, A. W.
Decatur, Ill.
Booth No. 308

CAWI MACHINE CO.
Lorain, O.
Booth No. 1901

Personnel: Heinz Riehme

WORTH ITS WEIGHT IN GOLD

R and L TURNING TOOL



Here are the tools which the R and L TURNING TOOL replaces:

Roller Box Tool	$ 70.50
Centering & facing tool	$ 20.50
Knee Tool	$ 34.25
Pointing Tool	$ 33.25
Back Rest	$ 24.50
Floating Drill Holder	$ 11.50
Balance Turning Tool	$ 44.00
	$238.50
Same for left hand	$238.50
	$477.00

One R and L Turning Tool of similar size (No. 1) costs only $87.50 . . . See what we mean by being "Worth its weight in gold"?

14 TOOLS IN ONE

CHANGES FROM RIGHT TO LEFT IN 10 SECONDS

No misalignment . . . Extremely fine adjustment provided . . . for rough and heavy cuts as well as finishing cuts . . . The R and L TURNING TOOL is constructed with best possible care and it is made of the finest steel!

Write for new catalog

R and L TOOLS

1825 BRISTOL STREET • PHILADELPHIA 40, PA.

☐ Send new catalog

☐ Please arrange for no-obligation demonstration of R and L TOOLS

NAME .....

COMPANY .....

ADDRESS .....

BB-3-56

See R & L Tools at Booth 741 ASTE Industrial Exposition, Chicago March 19-23

Encircle No. 304 on Card, Opposite Page 65

CENTURY ELECTRIC COMPANY
St. Louis, Mo.
Booth No. 252

Personnel: R. N. Hill, vice-pres., sales; G. C. Henderson, gen. sales mgr.; F. Powers, asst. gen. sales mgr.; F. R. Hatfield, G. H. Hodgskiss, dist. mgr.; J. H. Bolton, G. Bumann, A. F. Gerecke, G. M. Smith, W. C. Weglaufer, application eng.; F. E. Nutt, sales promotion mgr.; H. McInerney, sales promotion dept.
New Products: Flange mounted motor; rerated totally enclosed fan cooled fractional horsepower motor line; rerated totally enclosed fan cooled integral horsepower motor line; selective speed unit. This unit will be exhibited driving four motors. Visitors may operate it from a control panel.

CERRO DE PASCO CORP.
New York, N.Y.
Booth No. 773

Personnel: O. J. Seeds; R. S. Darnell; P. Schwan; D. M. Williams; J. Van Kampen.
Products: Cerro alloys (low temperature melting metals) and examples of their applications; spraying equipment and demonstration of mold-making by spraying and by casting.

THE CHALLENGE MACHINERY CO.
Grand Haven, Mich.
Booth No. 941

CHEMICAL DEVELOPMENT CORP.
Danvers, Mass.
Booth No. 286

Personnel: A. M. Creighton, Jr.; E. L. Hall; F. J. Albanese; R. T. O'Connor; R. Rosene, G. Peter.
New Products: Devcon A and B, the plastic steel; Devcon C, heat resistant type; Devcon F, the aluminum putty; Gaff-Bond 334, adhesive for cementing abrasive segments and grinding stubs.

CHICAGO DIAL INDICATOR CO.
Chicago, Ill.
Booth No. 1030

Personnel: Peter Flauter; Edward A. Iverson; Peter R. Flauter; Arthur F. Boruta.

Magnamatic nutrunners and screwdrivers, Chicago Pneumatic Tool Co.



Products: Dial indicators; snap gages; bench center sets; depth gages.

CHICAGO PNEUMATIC TOOL CO.
New York, N.Y.
Booth No. 1321

Personnel: J. B. Tiffany; M. F. Fitzgerald; G. J. Coffey; T. P. Harris; L. J. Walker; R. T. Beers; J. Andrew; D. Peterson; J. Kacmarik; H. Fischer; G. Harcourt.
New Products: Magnamatic one-shot screwdrivers and nutrunners. First setting retains the required torque value. Because of the one-shot clutch, operators drive as many as 16,000 screws per day.

CHICAGO RIVET & MACHINE CO.
Bellwood, Ill.
Booth No. 250

Personnel: W. O. Shineflug; J. A. Rehm; C. S. Barans; P. Masek; T. Best; John Sinclair; T. Kavenaugh; J. Tonn; W. Van Ness; A. B. Schroer.
Products: Automatic rivet setting equipment, single and multiple setting, setting compression rivets simultaneously; tubular and split rivets.

CHICAGO TRAMRAIL CORP.
Chicago 23, Ill.
Booth No. 445

Personnel: C. C. Riemenschneider; S. W. Fountain; J. D. Costello.
New Products: Working model of Trak-Rak system.

CHRYSLER SALES CORPORATION
Highland Park, Mich.
Booth No. 253

CIBA COMPANY, INC.
New York, N.Y.
Booth No. 1330

CINCINNATI MILLING MACHINE CO., THE
Cincinnati, O.
Booth No. 100

New Products: Induction hardening machine demonstrating on automotive turbine shafts—fully automated.
Other Products: Flamatic hardening machine selectively surface hardening automotive sprockets, in a production run, using city gas. To demonstrate electronic temperature control for rapid and accurate repetitive reproduction of exacting physical and metallurgical specifications.

CINCINNATI SUB ZERO PRODUCTS
Cincinnati 29, O.
Booth No. 665

Personnel: R. J. Jacobson, pres.; R. S. Jamison, asst. to pres.; T. J. Frederick, product. eng.; S. E. Wallar, sales eng.; Wm. S. Sherertz, J. P. Henderson, sales rep.
New Products: Model A-120-2 Sub-Zero chilling machine. For large scale production chilling. Will chill approximately 85 pounds of steel per hour.

DOES IT TAKE MORE THAN 8,000 HOURS TO TRAIN A TOOL & DIE MAKER?

And could any thing or any service ever get produced without his higher skills?

So he's a production personage; he rates the right steel in the right size at the right time—fine tool steel completely made-ready for his layout bench.

Consider, then, the advantages of **Warplis** . . .

The steel—oil hardening, non-warping, electric furnace tool steel of this well-known, perfectly balanced composition:

C. .90 Mn. 1.10 Cr. .50 Tung. .50 Va. .15

. . . unsurpassed for ease of working, for safe hardening without appreciable warpage or dimensional change, for fine performance.

The preparation—all sections, flats, squares and rounds, are ground—precision ground by improved techniques—and dimensionally true, with smooth, flawless, decarb-free surface.

The scope—651 standard sizes of flats and squares in 18" lengths; 180 standard sizes of rounds in 36" lengths.

The producer—Pittsburgh Tool Steel Wire Co., Monaca, Pa., leading specialists in cold finished fine steels for 54 years.

Procedures may be simplified . . . guess-work removed . . . confusion avoided . . . quality controlled . . . time and money saved . . . by standardizing on this one single grade—at no premium price—for finer tools and dies, and for precision parts, too.

The name to remember is **Warplis** . . . Warplis Ground Flat Stock (flats up to 2" thick and 14" wide; squares up to 4") and Warplis Drill Rods (rounds up to 2"). Available from selected distributors coast-to-coast, or write "Pittsburgh" for descriptive size and price folders.

PITTSBURGH TOOL STEEL WIRE CO. · MONACA, PA.

Since 1908 . . . makers of cold finished fine steels in all sizes, grades and shapes

Encircle No. 305 on Card, Opposite Page 65



Cincinnati Sub-Zero chilling machine, Model A-120-2.

Other Products: Model R-120-10; Model V-120-4 chilling machines. The former model is for metallurgical, laboratory and pilot plant operations. The latter, for experimental and testing applications.

CLAUSING DIV., ATLAS PRESS CO.
Kalamazoo, Mich.

Booth No. 1418

Personnel: G. C. Nancarrow; E. C. Garrett; Bruce Milroy; Flateau Allen; W. F. Brown; Floyd Stannard; E. H. Marsland; John Barnett; Willard Mantell.
New Products: 18" multiple spindle drill press; 12" lathe and production attachments. Heavy duty drill press has tables with 84"x22" working surface, drills 1" in cast iron, ¾" in steel, has 6½" spindle travel.
Other Products: Vertical milling machine; 12" lathe with clutch and brake countershaft.

CLECO DIVISION OF REED ROLLER BIT COMPANY
Houston, Tex.

Booth No. 688

Personnel: E. H. Elliott, mgr.; T. E. Donohue, sales mgr.; H. F. Moller, chief eng.; S. E. Rees, production mgr.; E. G. Clark, div. mgr., South Central area; N. R. Kensel, div. mgr., Detroit area; V. E. Dolan, div. mgr., North Central area; G. O. Logan, div. mgr., Southeastern area.
New Products: Multiple-spindle nut setters; vertical grinders; torque controlled screwdrivers.
Other Products: Standard line of drills, scalers, chippers, and impact wrenches.



Clausing 18" multiple spindle drill press.

CLEVELAND CUTTER & REAMER CO.
Cleveland 2, O.

Booth No. 758

Personnel: J. E. Buttermore; Arnold Scholbohm; Richard Krause; Wm. Siliko.
Products: Special metal cutting tools.

CLEVELAND INSTRUMENT CO., INC.
Cleveland, Ohio

Booth No. 920

COFFEY-CUMMINS MFG. CO.
Pasadena, Calif.

Booth No. 733

COGSDILL TOOL PRODUCTS
Oak Park, Mich.

Booth No. 185

Personnel: Frank Cogsdill; Gene White; Geo. Winberry; John Muldoon; H. Satterthwaite.
New Products: Burramatic and Groovematic tools will be demonstrated under power.
Other Products: Burraway and Bearingizer tools, also under power.

COLLINS MICROFLAT CO.
Los Angeles, Calif.

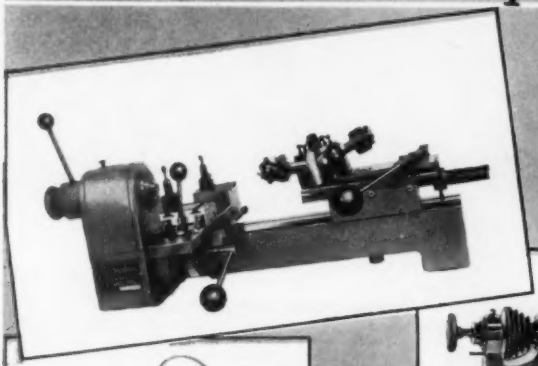
Booth No. 912

Personnel: Lee Collins; Harry Pulfer.
New Products: Microflat black granite

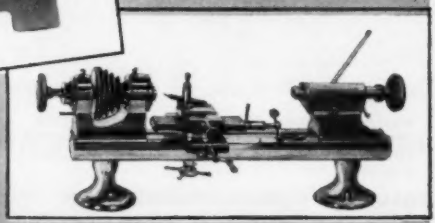
Collins Microflat Co.



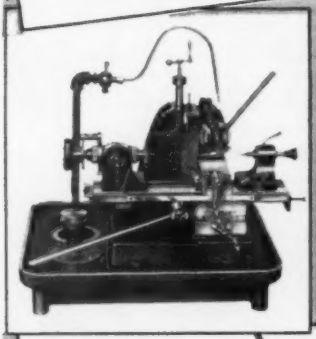
Derbyshire *fine precision equipment*



MODEL No. 750
BED 22"
CENTER HEIGHT — 7.30 CM
COLLET CAPACITY — .315"



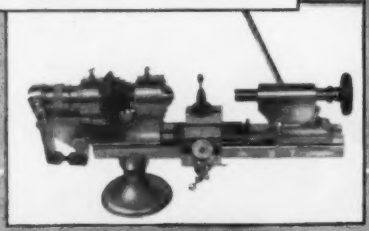
ELECT LATHE — 18" BED
CENTER HEIGHT — 2.35" (6 CM)
CHUCK CAPACITY — .004" to .315"



MICROMILL
2 TABLE SURFACES:
7⅛" x 2½"
12" x 2½"
TAKES
MAGNUS
COLLETS

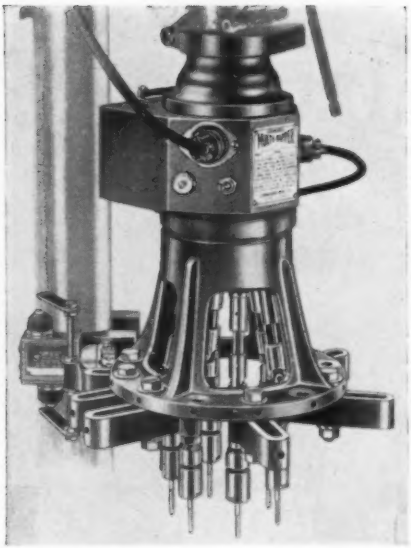


WEBSTER WHITCOMB
BED 12"
CENTER HEIGHT — 5 CM
COLLET CAPACITY — .1968"



MAGNUS LATHE — 12" BED
CENTER HEIGHT — 5 CM
COLLET CAPACITY — .315"

F. W. DERBYSHIRE, INC.
157 HIGH ST.
WALTHAM MASS.
Write for full details



Commander Multi-Tapper

surface plates; layout plates; parallels; straight edges; angle plates; toolmakers' flats; angle iron stands for surface plates.

COLUMBIA INTERNATIONAL CORP.
Long Island City, N.Y.

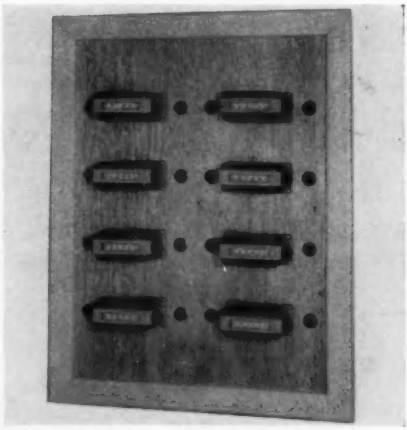
Booth No. 707

Personnel: Max A. Haas; Mrs. Max A. Haas; Carl W. A. Strohmeyer; Fritz Poucker.
New Products: Optical jig boring machine with automatic positioning to repeat within 1/10,000ths" accuracy, Type ABAv1600; hydraulic optical jig boring machine, Type HYOP54; Carsten's cylindrical grinder with tilting table for very fine infeed; Elb hydro surface grinder with infinitely variable infeed from 0 to 2" per stroke.
Other Products: Weisser chucking lathe, 1⅝" capacity.

COMMANDER MFG. CO.
Chicago, Ill.

Booth No. 800

New Products: Multi-Tapper; air actuated Pneu-Matic tapper. The Multi-Tapper is a universally adjustable multiple spindle tapping attachment for any drill press, which permits up to eight holes to be tapped at one stroke. A pitch compensating feature for the unit's spindles permits simultaneous tapping with taps of different pitch.
Other Products: Multi-Drill; Select-A-Spindle; Lead-Matic tapper; Multi-Angle drill unit; tapper; drill chip breaker.



Count O Larm remote control panel.

COUNT O LARM CO.
Chicago, Ill.

Booth No. 744

New Products: Automatic counter for screw machines—counts only full-length parts and serves to minimize lost time on a screw machine by sounding a loud alarm when the machine is running without bar stock; twin counter unit which permits simultaneous recording of the total job count and the individual shift count. A remote panel

Crafts carbide circular form tools.





Famco Air Presses at Bell & Howell Company, manufacturers of precision, photographic, optical and electronic equipment

3 famco air presses

save Bell & Howell Company $2,000 per year

Famco Air Presses have replaced the engraving of serial numbers on three of Bell & Howell's major camera lines. Collectively this change-over has saved approximately $2,000 per year based on present production facilities and the Air Presses paid for themselves in approximately 6 months time. In addition to savings, Famco Air Presses performed with minimum maintenance and a perfect safety record.

Bell & Howell has been using Famco Machines for approximately 5 years and has about 150 machines—air presses, arbor presses, power presses. They are used for various types of bench assembly work—pressing pins into castings, pressing shafts into gears, staking and stamping serial numbers.

Your dealer can give you complete information on Famco Products, or you can write to Famco direct for FREE illustrated catalog.

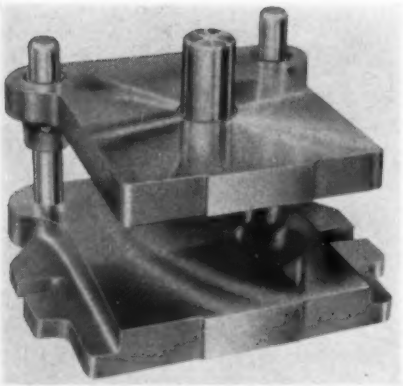
famco machine company

3118 SHERIDAN ROAD • KENOSHA 16 WISCONSIN

Arbor Presses • Air Presses • Drill Presses • Band Saws

Power Presses • Foot Presses • Squaring Shears

Encircle No. 307 on Card, Opposite Page 65



Danly Leadership line die set.

counter makes it possible to locate in any part of the plant or front office a panel showing the production of every screw machine in the factory.

CRAFTS CO., INC., ARTHUR A.
Boston, Mass.

Booth No. 1025

Personnel: Edward Hirchert, Chicago plant mgr.; O. E. Stevens, Detroit mgr.; William Risko, Howard Shaeffner, Jack LeQuesne, Bud Jewell, Richard Hirchert, sales eng.
New Products: Mechanically held carbide circular form tools.
Other Products: Carbide and diamond tools; gages; wear parts.

CRANE PACKING CO.
Chicago, Ill.

Booth No. 1227

Personnel: K. V. Rohlen, pres.; C. E. Schmitz, vice-pres.—sales; V. E. Vorhees, asst. gen. sales mgr.; F. E. Layton, sales mgr., Lapmaster div.; E. F. Katzke, asst. sales mgr., Lapmaster div.; R. J. Stark, sales mgr., seal div.; E. H. Stubenrauch, sales mgr., packing div.
New Products: Model 36" Lapmaster—production lapping machine for gaining precision flatness to less than .000116", finish to 1 rms. Equipment for every requirement.
Other Products: Mechanical packings; mechanical seals; Teflon products; pipe joint and thread compounds.

CRESCENT TOOL & MACHINE CO.
Lincoln Park, Mich.

Booth No. 144

CRODIAN & COMPANY
Indianapolis, Ind.

Booth No. 1222

CRUCIBLE STEEL CO. OF AMERICA
Pittsburgh, Pa.

Booth No. 297

CRYSTAL LAKE GRINDERS
Crystal Lake, Ill.

Booth No. 693

Personnel: R. H. Kirwin; B. W. Kirwin; W. E. Stokes; E. J. Stokes; John Kirwin; Raymond Kanaly; Clifton Millar; J. Teetsov, Jr.; Mitchell Siewert; Elroy Handrock.
New Products: No. 816 universal roll grinder.
Other Products: Model No. 612 surface grinder with Pratt & Whitney Diaform.

CUSHMAN CHUCK CO.
Hartford, Conn.

Booth No. 579

Personnel: Harry E. Sloan, Jr.; Wm. C. Gaw; John L. Way; Frederick H. Fippinger; Lynwood Swanson; Jerome J. Rutherford; John E. Hathaway; John C. Lynch; A. J. Burkhardt; S. L. Whittemore; C. P. Whittemore; A. L. Whittemore.

DAKE CORPORATION
Grand Haven, Mich.

Booth No. 1707

Personnel: Paul Johnson

DANLY MACHINE SPECIALTIES, INC.
Chicago, Ill.

Booth No. 596

New Products: Leadership line of die sets and diemakers' supplies. Precision lapped chrome-plated guide posts are standard equipment in all precision die sets in the line. Demountable bushings are available as an optional feature. Steel shoulder bushings prolong die set life. Standard fittings on bushings for oil lubrication. All four working surfaces, including top of punching holder and bottom of die holder, are ground.

DAVEY COMPRESSOR
Kent, O.

Booth No. 1820

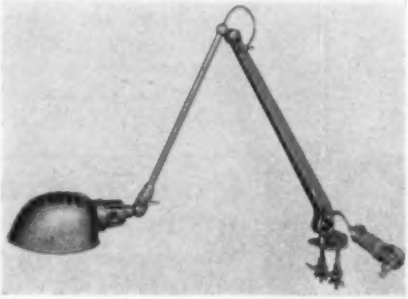
Personnel: L. W. Darling

DAVIS BORING TOOL DIVISION, GIDDINGS & LEWIS MACHINE TOOL CO.
Fond du Lac, Wis.

Booth No. 489

Personnel: Erwin J. Kaiser, gen. mgr.; Milton J. Kuhn, sales mgr.; Vernon E. Unger, chief eng.; Harvey R. Plummer, chief tool eng.; Harold L. Johnson, T. R. Sullivan, D. L. Harris, field engineers; Harold Garrison, asst. supervisor, field

Dazor adjustable-arm air cooled incandescent lamp, Model 1102.



"Now you can afford a Centerless Grinder"

—John H. Poll, Director of Sales, Royal Master, Inc.





Centerless Grinder—for tool room and production work.

"The Royal Master Centerless Grinder is within the price reach of even the smallest machine shop. Yet it is so efficient and versatile that it has appeal to the largest manufacturer.

"The Royal Master Grinder grinds plastics, tungsten carbide, carbon steel, alloys, stainless steel, glass, and many other materials.

"Tolerances as low as .0002" are consistently held and 6 - 8 micro inch finishes are easily obtained.

"It requires only 24" x 48" floor space.

"Set up time is approximately only half that required for other grinders.

"One man can handle up to 6 of these grinders at one time."

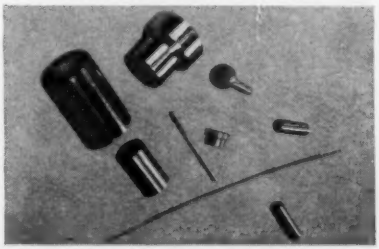
The Royal Master Centerless Grinders will handle practically any shape up to 1".

Service department operates 24 hours a day.

Hydraulic set up can be provided at additional cost.

Write today for prices and complete description.

See this grinder in operation at the ASTE Show, Chicago, March 19-23, Booth 810.



Example of work done on Royal Master Centerless Grinder.

ROYAL MASTER INC.

220 State Highway 23

Riverdale, New Jersey

Encircle No. 308 on Card, Opposite Page 65



Detroit Reamer & Tool Grip-Tip center.

service; R. T. Beirne, advertising mgr.; Allan E. Eggers, advertising.

New Products: Boring bars; block type cutters; tool holders; boring heads; stub boring bars; planer tools; arbors and sleeves.

A. G. DAVIS GAGE & ENG'G CO.
Hazel Park, Mich.

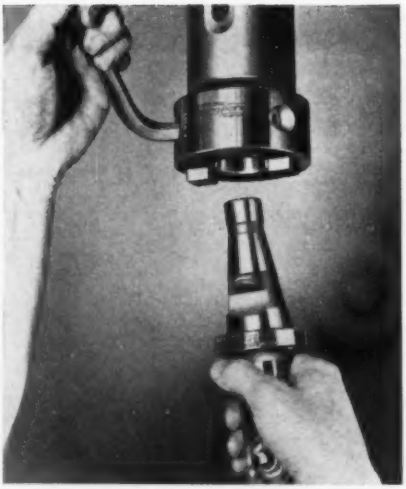
Booth No. 1134

DAZOR MFG. CORP.
St. Louis, Mo.

Booth No. 784

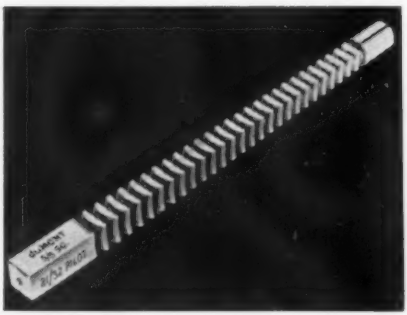
Personnel: J. A. Mehr; S. R. Woll; D. W. Caughlan; E. S. Swanson; P. J. Lordo; F. A. Watts.

New Products: Model No. 1102 adjustable-arm air-cooled incandescent lamp with side-mounted reflector. The lamp is available with a top-mounted reflector, Model No. 1100. The adjustable arm is also made with a magnifier

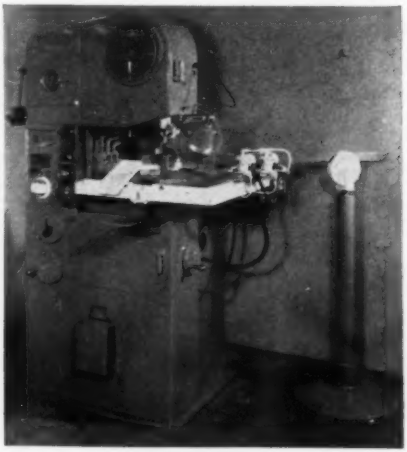


De Vlieg Microbore tool holder and boring bar.

du Mont square broach.



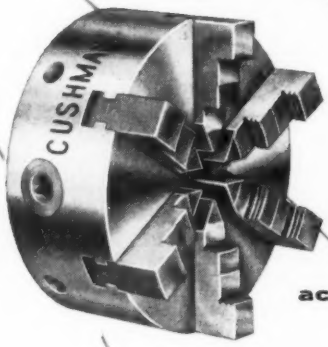
DoAll Model 16-3 band machine arranged for automatic angle cutting on stacked bar stock.



CUSHMAN chucks

give Chuck-ability

CHUCK-ABILITY — The ability to SPEED your work . . . ELIMINATE fatigue . . . IMPROVE your products . . . and REDUCE your costs . . . through design and selection of the right work-holding devices.

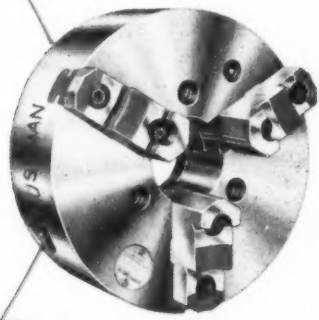


see these new chucks at . . .

BOOTH 579 ASTE SHOW

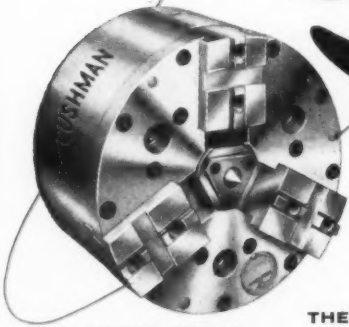
accra-set chucks

- Simple, quick adjustment . . . repeats to .0005" T.I.R.
- Ideal for precision bar work.
- Rigid body with positive locking eliminates rotational slippage.
- Available with 3 or 6 jaws.



manually operated compensating chucks

- Maximum compensation with precision performance.
- Permits holding irregularly shaped workpieces.
- Available for medium or heavy duty work.



air operated compensating chucks

- Greater compensating action than ever before possible.
- The advantage of two chucks in one body . . . compensating action or regular self-centering operation.

THE CUSHMAN CHUCK COMPANY · Hartford 2, Connecticut

CUSHMAN CHUCKS . . .
a Product of American Quality, Labor and Materials.

a world standard for precision

CUSHMAN or CHUCKMAN CHUCKS

SEE YOUR INDUSTRIAL DISTRIBUTOR

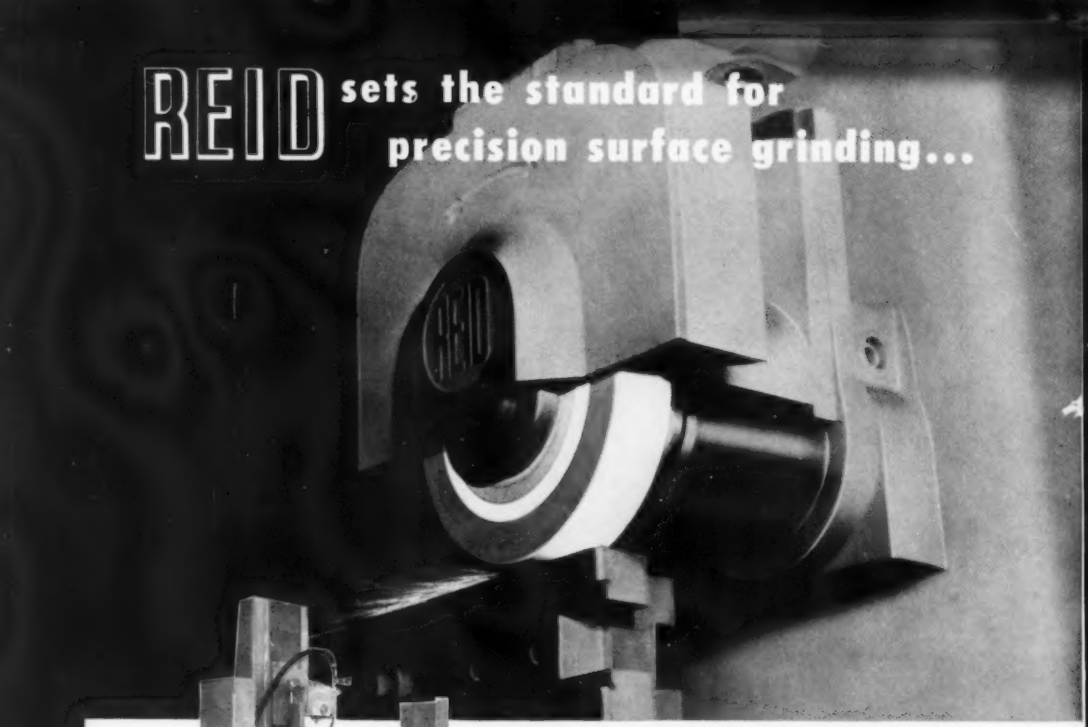
manufacturers of:

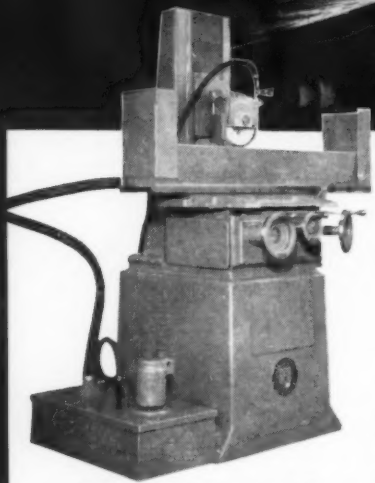
Air Operated Chucks, Cylinders, and Accessory Equipment . . . The Cushman Power Wrench . . . Cushman Manually Operated Chucks and Face Plate Jaws.

2C6548

Encircle No. 1A on Card, Opposite Page 65

REID sets the standard for precision surface grinding...

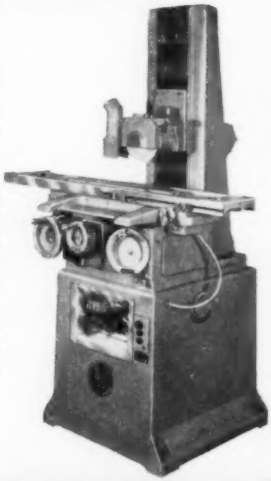




MODEL 618H convenient finger-tip level controls for all operations make this grinder the favorite of the toolroom for the finest tool and die grinding. Accessories, including Cool-Grind or wet grinding attachments, magnetic chucks and form dressers give extreme versatility for all operations.

MODEL 618VL designed for precision grinding to the finest tolerances with superior surface finish . . . rugged construction and painstaking finishing give true dependability for continuous operation with minimum maintenance. Features power feed table with traverse speed variable from 12 to 35 feet per minute.

Photo courtesy of Robertson Mfg. Co.



SPECIFICATIONS

CAPACITY: 6" wide, 18" long, 17¼" high from spindle center to table.
WORKTABLE: 51" x 8" overall.
FEED RANGE: Elevating hand wheel (r.) graduated to .0005" (optional, vernier to .0001"); cross feed to .001"; power cross feed adjustable .006" to .100" at either or both ends of table reverse.
GRINDING HEAD: with 3" opening for standard 1 h.p. cartridge type motorized spindle. Wheel size: 7" x ½" x 1¼".
FLOOR SPACE: 71" x 43½".
WEIGHT: 2100 lbs. net.

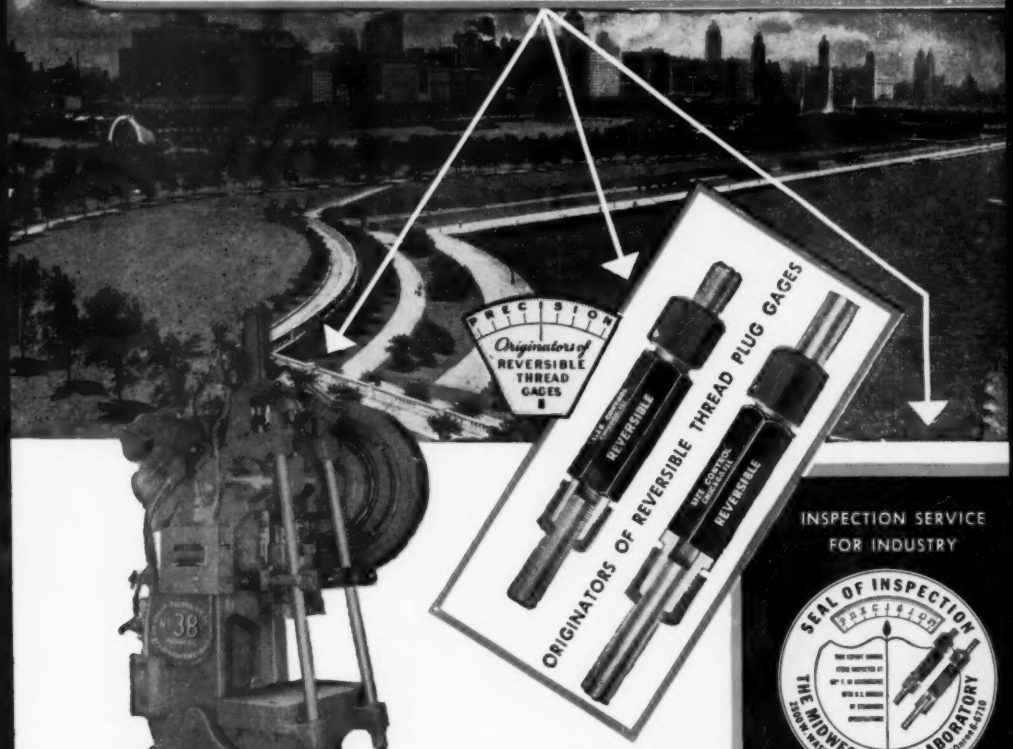
Write for Bulletin 618-6

Reid Brothers Company, Inc.

BEVERLY, MASSACHUSETTS

From the HEARTLAND of America

From Chicago—the Heartland of America—these three leaders in their respective fields of production and precision can help you with your manufacturing problems.



WALSH 38-TON
Air-Clutch High Production O.B.I. Press

INSPECTION SERVICE FOR INDUSTRY

SEAL OF INSPECTION
precision
THE MIDWEST GAGE LABORATORY
2500 W. WASHINGTON BLVD., CHICAGO 12 • MOnroe 6-6710

Let our experience in the fields of production and precision prove beneficial to you and your product. Write on phone these Chicago firms for complete information about their important new products and services. In addition, all offer free engineering consultation services. There's no obligation on your part, of course.

VISIT US IN BOOTH - 930 -
March 19-23, 1956 - ASTE Show - Chicago - International Amphitheatre - Or In Our Factories

Industrial Divisions of AMERICAN GAGE and MACHINE COMPANY

SIMPSON ELECTRIC COMPANY
5200 West Kinzie Street
Chicago 44, Illinois EStebrook 9-1121
Panel Meters and
Electronic Test Equipment

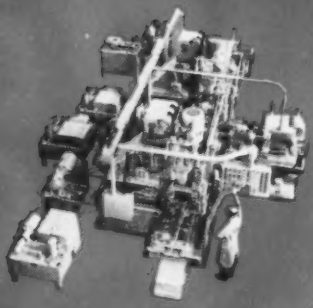
WALSH PRESS & DIE COMPANY
4709 West Kinzie Street
Chicago 44, Illinois EStebrook 8-6700
Punch Presses Since 1907

SIZE CONTROL COMPANY
2500 West Washington Boulevard
Chicago 12, Illinois MOnroe 6-6710
Precision Gages
Centerless Lapping Machines

MIDWEST GAGE LABORATORY
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Chicago 12, Illinois MOnroe 6-6710
Inspection Service for Industry

Here's Automatic Production On High-precision Parts





Multiple-spindle drilling, boring, facing and tapping machines
Special machines for automatic production

When is fast transfer production limited by precision requirements? This frontier is steadily being pushed back by Natco engineers in new Holeway processing machines.

Take this throttle body, for example. The large holes are reamed to *limits of .0015" for location, .0003" for size, 125 microinch* finish! Production — *600 parts per hour!*

Natco's high-speed gun-drilling heads give required finish in interrupted throttle-shaft holes without reaming. Size is held to within .001".

Many unusual problems are solved in locating, holding and positively controlling light-weight parts between stations at high transfer speed. Chip disposal is automatic; cutting oil is filtered for re-use.

Here's the sequence of operations. Combination rough and semi-finish ream four large holes. Gun drill two holes (two break-throughs each). Finish ream four large holes.

Whenever fast, automatic production makes sense, don't let high-precision requirements stop you. A Natco engineer can tell you in a hurry whether it's feasible and how the job can be done.

NATCO

National Automatic Tool Company, Inc. *Richmond, Indiana*

Encircle No. 1D on Card, Opposite Page 65

mounted at its end, Model No. M1106.

Other Products: Floating lamps, both fluorescent and incandescent; floating magnifiers with fluorescent lighting; flexible-arm lamp; other adjustable-arm lamps.

DELTA POWER TOOL DIVISION
ROCKWELL MFG. CO.
Pittsburgh 8, Pa.

Booth No. 1410

Personnel: F. P. Maxwell, vice-pres.; Byron E. Coon, sales promotion mgr.; Ben Eldridge, metalworking products mgr.; G. H. Madeska, West Central regional sales mgr.; C. K. Branch, Dan Irvin, district sales mgr.

New Products: Improved belt grinder—featuring new rubber contact wheels and improved belt alignment adjustment; long-bed model of 11" metalworking lathe; improved model of 14" band saw.

Other Products: Toolmaker-grinder; standard 7" grinder; drill presses; accessories.

DENISON ENGINEERING
Columbus, O.

Booth No. 1706

Personnel: R. H. Krepps

DETROIT MILLING CUTTER CO.
Farmington, Mich.

Booth No. 329

Deburrs 1520

1" TUBE ENDS PER HR. on PINES END FINISHING MACHINE



Here's another outstanding example of how the Pines No. 600 End-Finishing Machine is setting records for production speed and efficiency. Today, at Configured Tube Products Company, Bellwood, Illinois, the Pines Machine (shown at right) performs inside and outside deburring on 1" steel tubing at net production rates of 1520 tube ends per hour. Such high-speed production is made possible by the exclusive design of the Pines Machine which enables the operator to clamp and feed work to the rotating cutters in one pass, so that one hand is always free for rapid stock handling.

Exclusive Features Speed Work

Still other outstanding Pines features such as quick, interchangeable tool holders, chuck inserts, 8-speed sheave (760 to 3920 rpm), sturdy spindle, and grease-sealed precision bearings assure fast, accurate work. The Pines No. 600 handles chamfering, pointing, facing, and reaming operations, as well as deburring, on stock diameters up to 2". Maximum feed stroke is 1-1/4". Automatic air-operated units for higher production work, and larger sizes up to 5" capacity are also available.

PINES ENGINEERING CO., INC.
Specialists in Tube Fabricating Machinery
698 WALNUT • AURORA, ILLINOIS
PRODUCTION BENDING • DEBURRING • CHAMFERING MACHINERY

FREE BULLETIN
Write for facts on how these machines cut production costs.



Encircle No. 309 on Card, Opposite Page 65

DETROIT POWER SCREWDRIVER CO.
Detroit, Mich.

Booth No. 571

Personnel: R. F. Gladfelter, gen. sales mgr.; Earl Raycraft, eng.
New Products: Parts feeders.
Other Products: Screw driving machines.

DETROIT REAMER & TOOL CO.
Birmingham, Mich.

Booth No. 224

Personnel: Leo A. Obloy; R. W. Andreasson, Jr.; Ralph Wojcinski; W. J. Lund; Frank Borgon.
New Products: Grip-Tip center; Wej-Lok tool holder; Model 500 circularity grinding attachment. The Grip-Tip center has replaceable carbide tip available in ¼" and ½" dia., accurate to .0003".
Other Products: High speed steel and carbide tipped cutting tools; reamers, drills, c'bores, end mills, c'sinks, oil hole drills, etc.; subland drills and subland tools; core drills, c'bores, chamfer tools, oil hole drills.

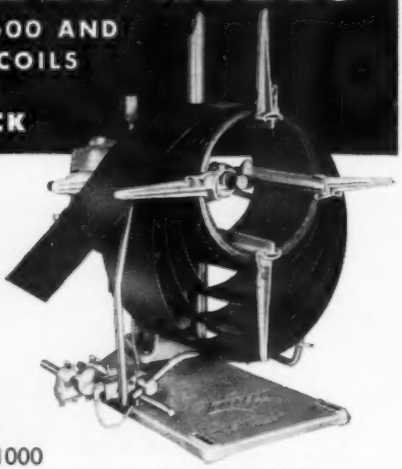
DETROIT STAMPING COMPANY
Detroit, Mich.

Booth No. 752

Personnel: Wm. H. Roberts; C. W. Hoppe; H. C. Robeson; S. C. McIlwain; Dominic Damm.
New Products: Several new models of De-Sta-Co toggle clamps, including air-operated units.
Other Products: Arbor spacers; shim

LITTELL REELS

FOR 300, 600 AND 1,000 LB. COILS DELIVERED FROM STOCK



No. 10 Littell Motor Driven Automatic Centering Reel for up to 1000 pound coils.

Three sizes of Littell Reels, for 300, 600 and 1000 pound coils are now in stock for *immediate* delivery. Easy to load, they center the coil automatically, hold it in balanced position. You get easy, smooth unwinding, greater accuracy and higher speeds for both hand and automatic feeding. All three sizes available in single or double Plain Brake or Motor Driven Reels. Write for catalog.

F. J. LITTELL MACHINE CO.
Speed with Safety

ROLL FEEDS • COIL CRADLES
STRAIGHTENING MACHINES
REELS • AIR BLAST VALVES
District Offices: Detroit, Cleveland

4147 N. RAVENSWOOD AVE., CHICAGO 13, ILL.

Encircle No. 310 on Card, Opposite Page 65

DESTACO

TOGGLE CLAMPS *Boost* PRODUCTION



De-Sta-Co Toggle Clamps are extremely flexible in their application and are easily adapted to work-holding problems in drilling, milling, reaming, boring, welding, bonding, machining or other production processes. You get more production with fewer rejects at lower tooling costs when you tool up with versatile De-Sta-Co Toggle Clamps.

Parts are held firmly in perfect alignment, insuring precision from the first piece to the last, with smooth, fast, powerful action, clamping and releasing in split seconds. Your fixtures cost less when they're designed around these low-cost work-holding tools . . . reduce labor costs of ordinary work-holding methods.

De-Sta-Co Toggle Clamps are engineered and built for precision uniformity . . . reamed bearing holes insure fit, long life and sensitive operation . . . foolproof, positive action — no cams . . . friction relieving off-sets in handles and links . . . cold drawn solid bars, forged portable clamp parts. Accessories for adapting them to fixtures are available.

Our toggle clamp catalog describes more than 60 stationary and portable clamps designed for every work-holding problem. Write today for your copy and name of distributor nearest you.



SEE US AT A.S.T.E. SHOW—BOOTH 752

DESTACO **DETROIT STAMPING COMPANY**

347 Midland Avenue • Detroit 3, Michigan

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stock; feeler gage material; blower housings; range of small to medium-large stampings.

DEVLIEG MICROBORE CO.
Royal Oak, Mich.

Booth No. 421

Personnel: C. B. DeVlieg; C. R. DeVlieg; R. A. Smith; G. T. Hearn; R. J. DeVlieg; H. A. Beyer.
New Products: Flash-Change tool holders, adapters, and boring bar sets. Tool holders provide maximum rigidity for all types of drilling, boring, and milling operations. Tools can be changed in seconds.
Other Products: Microbore precision tooling for precision boring, turning and facing operations.

DIE-DRAULIC GRIP, INC.
Grand Rapids, Mich.

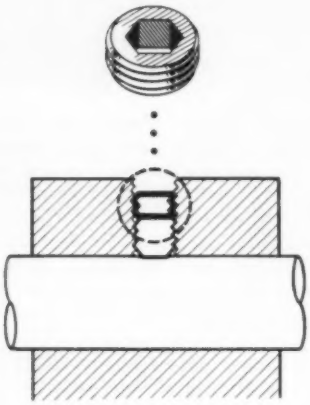
Booth No. 632

Personnel: C. A. Barrett, pres.; Mrs. C. A. Barrett, vice-pres.; J. P. Kingsbury, chief eng.; W. K. Combs, dept. mgr.; Ed. Jacobitz, secy.-treas.; Howard Britton, F. S. Storey, A. C. Graham, E. E. Walker, R. K. Williams, Walter Cavender, sales rep.
New Products: Model 0-1001 grip unit.
Other Products: B-1001 grip unit with solenoid operated air valve attached; B-2001 grip unit with gages; C-1001 grip unit; C-2001 grip unit; L & J punch press equipped with either a B-2001 or an A-2001 unit with gages; die cushion;

STOP SET SCREW SLIPS!

...with Mac-it Hollow Lock Screws

SEE US AT BOOTH 906 ASTE SHOW



Excessive speed and vibration can't shake loose a socket set screw when the Mac-it Hollow Lock Screw is on the job! Why? Because it's tightened *against the set screw* to produce "internal lock nut" action.

This Mac-it Hollow Lock Screw is a tough customer! It's made of high-grade alloy steel—carefully heat treated throughout for a fine, uniform grain structure. Accurate socket and threads hold their shape even after thousands of adjustments.

Because the hex socket goes all the way through, assembly is quick and easy: a set screw and lock screw may be tightened separately or together using the same key—and the set screw may be re-set without removing the lock screw.

Your local distributor carries complete stocks of Mac-it Hollow Lock Screws in sizes #6 to 1", either N.C. or N.F. threads, Class 3 fit. Ask him for free samples and literature, or write:

Mac-it Screw Division

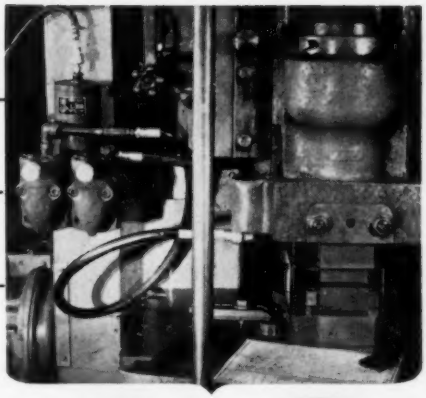
STRONG, CARLISLE & HAMMOND COMPANY

1392 West 3rd Street • Cleveland 13, Ohio

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The Barrett

DIE-DRAULIC GRIP

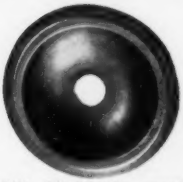


Efficient hydraulic die pad pressure—Holding stock while forming or drawing

ELIMINATES DIE PAD PRESSURE PROBLEMS

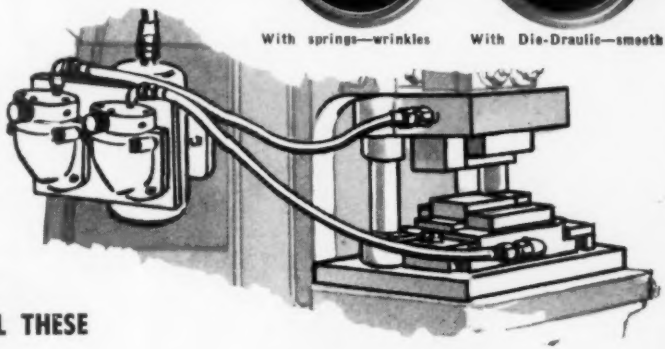


With springs—wrinkles



With Die-Draulic—smooth

See the DIE-DRAULIC at Booth No. 632, ASTE Show, International Amphitheater, Chicago, March 19 to 23



NO OTHER METHOD CAN GIVE YOU ALL THESE ADVANTAGES:

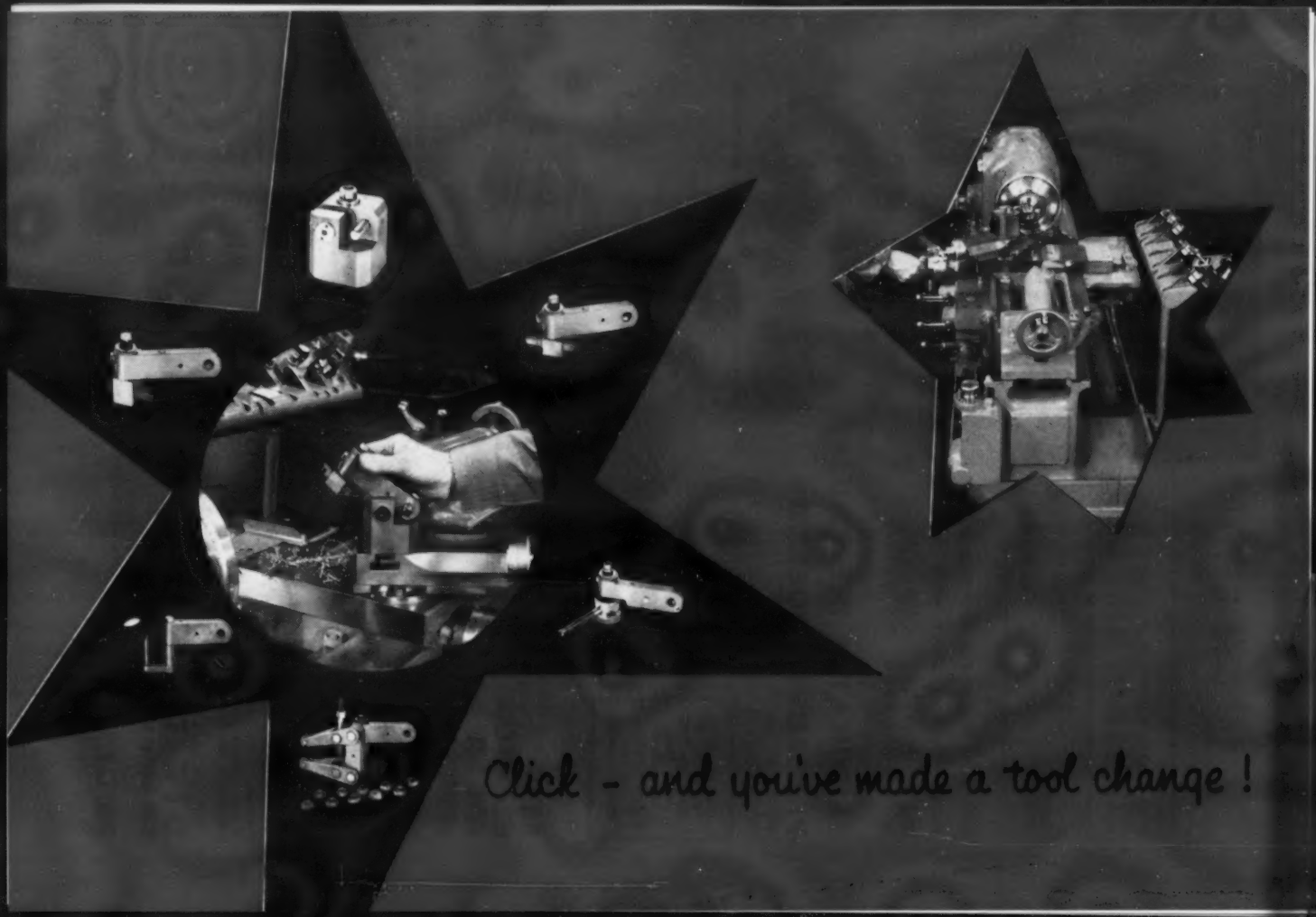
1. Full required pressure from near the start of pad movement.
2. Pressure easily adjustable—use only the required amount—no waste.
3. Several pressures from one unit for correct application to each die station.
4. Small pistons in die deliver enormous hydraulic pressure.
5. Compact rugged unit—no complicated circuit, pumps or motors.
6. Does away with down time due to spring breakage.
7. Always better stampings but in some cases may eliminate operations.

Used By Large and Small Manufacturers In All Parts of the Country.
Profit by the experience of others, enjoy the profitable advantages of Die-Draulic Grip now.
Full simple data available showing how you may apply Die-Draulic Grip to solve your problem.
If you have a print or sketch of your die we shall be glad to sketch into it the Die-Draulic application.

Write-Wire or Call Today

DIE-DRAULIC GRIP, INC.
528 Butterworth St., S.W. Grand Rapids, Michigan

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Click - and you've made a tool change !

Pre-Ground, Pre-Calibrated Monarch *QUIK-TOOL* Ready-Set Tooling Provides Immediate Tool Change

What's Quik-Tool? It's a tool block and set of seven tool holders, all precision ground and pre-calibrated to provide better accuracy of positioning and response than you get from any turret.

And it's fast! Tools automatically position themselves when slipped onto a locating pin and swung into the slot of the tool block. They don't even have to be aligned or clamped into position, as the precision fit of tool holder and tool block insures rigidity and accuracy.

Monarch Quik-Tools are specifically valuable in the toolroom or instrument shop for practically any type of turning, with tools used in any desired combination or sequence. The standard tool setups can be used, without adjustment to tool settings, for a wide variety of jobs. Holders are designed for standard tools and gages.

How about it? Don't you want to know *all* about how Monarch Quik-Tool eliminates lengthy setups and cuts tool change time to seconds? Send for our complete illustrated booklet today . . . . . ***The Monarch Machine Tool Company, Sidney, Ohio.***

Encircle No. 314 on Card, Opposite Page 65

Tool block fits any standard Monarch 10" Model EE Toolmaker's or Manufacturing Lathe compound rest "T" slot. Tools can be used in any combination or sequence for turning, boring, facing, chamfering, grooving, necking, threading, knurling, or cut-off. The tools automatically position themselves.

Monarch
TURNING MACHINES
FOR A GOOD TURN FASTER . . . TURN TO MONARCH

Fill Out This Coupon and Clip to Your Business Letterhead, Please

THE MONARCH MACHINE TOOL CO., SIDNEY, OHIO

Please Send Me Your Illustrated Quik-Tool Booklet #306.

NAME_____

TITLE_____

multi-unit. The model B-2001 grip unit will be attached to a punch press operating a die from which actual stampings will be produced. The part to be formed represents one having a reverse bend which can be produced in one hit by the use of the grip. Basically all of the units exhibited are alike. They differ in the oil displacement possible per valves, making possible a different pressure in two stages of the die.

EUGENE DIETZGEN COMPANY
Chicago, Ill.

Booth No. 785

DoALL CO., THE
Des Plaines, Ill.

Booth No. 1520

New Products: Demon saw band; power saw; Models 16-3 and 26-3 Contourmatic band machine; surface grinder; 3-in-1 coolant system incorporating "cool grinding," where the coolant is ejected through the wheel; Micromatic precision slicing machine, offering complete facilities for parting and slicing extremely brittle, crystalline materials such as germanium and silicon. Machine is designed to conserve expensive metals by reducing as little material as possible to dust in the cutting process. Two

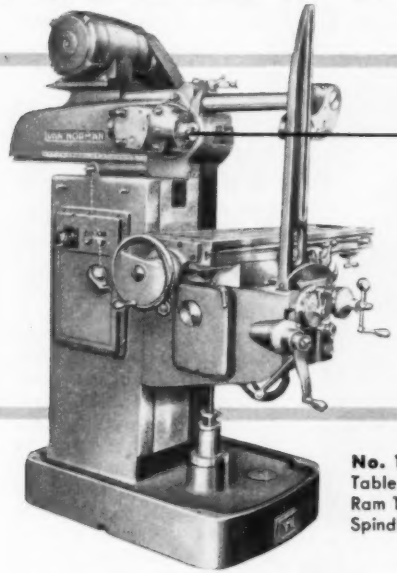


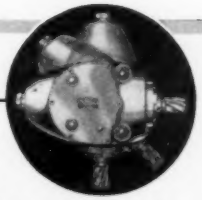
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The New VAN NORMAN No. 16M

RAM TYPE MILLER

Saves Equipment Dollars . . . Cuts Production Costs!





Exclusive Adjustable Cutterhead permits Horizontal, Angular and Vertical Milling on ONE Miller without attachments.

No. 16M
Table Size: 40½" x 10"
Ram Travel: 20½"
Spindle Motor: 3HP

Why buy two single purpose machines when for the price of *one* Van Norman Miller you get horizontal, vertical as well as angular milling? Not only do you save on capital investment but you also get more production and reduce milling costs.

Don't wait . . . for extra profits install a Van Norman Machine now! They are available on five purchase plans — Outright sale . . . Purchase on conditional sales contract up to 5 years . . . Pay as you depreciate . . . Straight lease . . . Lease with option to buy. See your dealer or write Van Norman Company.

Lease and Conditional Sales Contracts not available to Export.

VAN NORMAN MACHINE CO.

SPRINGFIELD 7, MASSACHUSETTS

MANUFACTURERS OF — Ram and Column Type Milling Machines, Cylindrical Grinders, Spline and Gear Grinders, Oscillating Radius Grinders, Special Production Grinders, Centerless Grinders.

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gaging services will be announced at the show.

Other Products: Complete line of measuring tools; Micro-Step gaging system; square block gaging accessories for assembling rectangular or square blocks into working gages; granite surface plates; Bausch & Lomb optical comparators; complete range of cutting tools, tool steel and other industrial supplies.

DOERR ELECTRIC CORPORATION
Cedarbirg, Wis.
Booth No. 352

THE DOW CHEMICAL COMPANY
Midland, Mich.
Booth No. 362

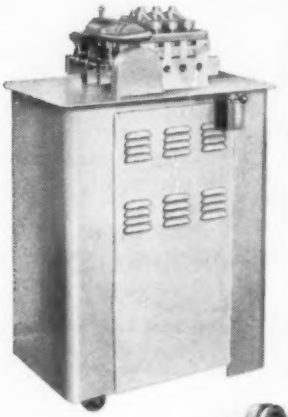
DRILLMATION COMPANY
Hazel Park, Mich.
Booth No. 737

duMONT CORP.
Greenfield, Mass.
Booth No. 1106

Personnel: J. S. duMont, vice-pres.; C. W. Berry, chief eng.

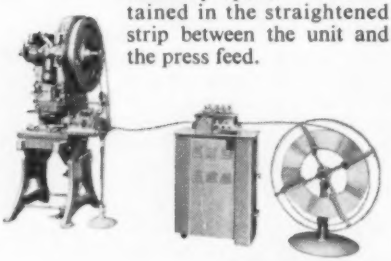
New Products: Standard stock push-type square and hexagon broaches to finish square or hexagon shapes in drilled, reamed or cast holes in one

Economy · Dependability



WITTEK
STOCK STRAIGHTENERS

Used in conjunction with a reel stand and automatic feed for punch presses, the Wittek Stock Straightener is a self-contained, motor-driven unit designed for maximum efficiency in the continuous straightening of coiled stock. Standard models handle stock with widths up to 12 inches. An infinitely variable speed drive permits any desired straightening speed so that the proper slack is maintained in the straightened strip between the unit and the press feed.



This typical Wittek automatic production feeding setup includes —Wittek roll feed mounted on the punch press, Wittek stock straightener, and Wittek self-centering reel stand.

5577

Write for full particulars
WITTEK Manufacturing Co.
4321 W. 24th Place • Chicago 23, Illinois

Production Feeding Equipment

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still the winner

. . . and in high speed steels, nothing beats REX

The winner and still champion after fifty years is Crucible's REX high speed steel. *And now it's better than ever!* Recent improvements in manufacturing processes have given even higher quality and greater uniformity to every one of its properties.

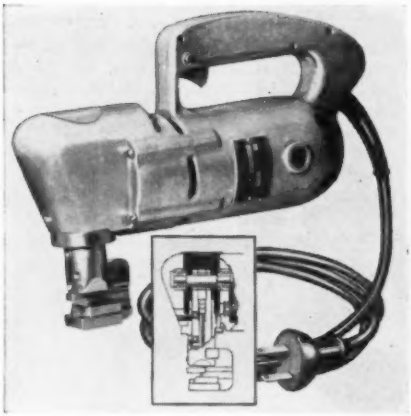
Why not shop test the new REX yourself? Test it for size, structure, response to heat treatment, fine tool performance. Give it any test you wish. You'll see why it is today, as it has always been – *the standard by which all other high speed steels are compared.*

Ask for REX by name at your local Crucible warehouse. Or order it directly for prompt mill delivery. And for information on REX, and the other Crucible special steels, send for the *Crucible Publication Catalog. Crucible Steel Company of America, The Oliver Building, Mellon Square, Pittsburgh 22, Pa.*

CRUCIBLE first name in special purpose steels

Crucible Steel Company of America

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Fenway Model HN heavy duty nibbler, Electro Arc Sales Co.

pass. Eight standard sizes available on each type.
Other Products: Minute Man keyway broaches and sets; special broaches of all types; Minute Man magnetic gage bases; high speed ground tool bits, square and rectangular; hand-operated arbor presses.

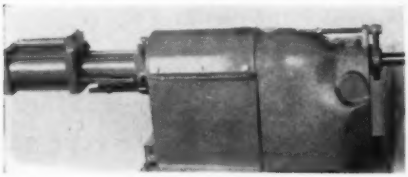
DUMORE CO., THE
Racine, Wis.
Booth No. 671

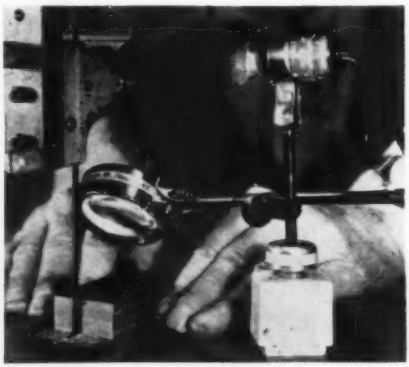
Personnel: A. E. Owen; T. Carroll; G. Zavis; G. McManners; B. Michels; H. L. Wardrip; C. F. Miller; J. Steibel; D. McCullough; R. I. Hamilton; G. E. Shoup.
New Products: Drill-N-Tap automatic drilling and tapping unit with self-reversing motor. For left hand or right hand threads. Super-Flex flexible shaft tool; Micro-Drill, for drilling holes as small as .001".
Other Products: Tool post and hand grinders; automatic drilling and tapping units; flexible shaft tools; quills; drill grinder.

DURANT MFG. CO.
Milwaukee, Wis.
Booth No. 720

Personnel: R. B. Winkler

Electro-Mechano Model 603 automatic drilling unit.





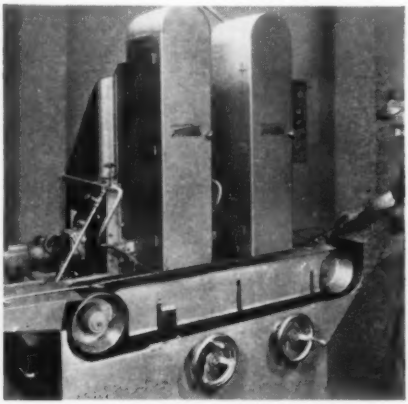
Enco Model 220 Tiny-Titan.

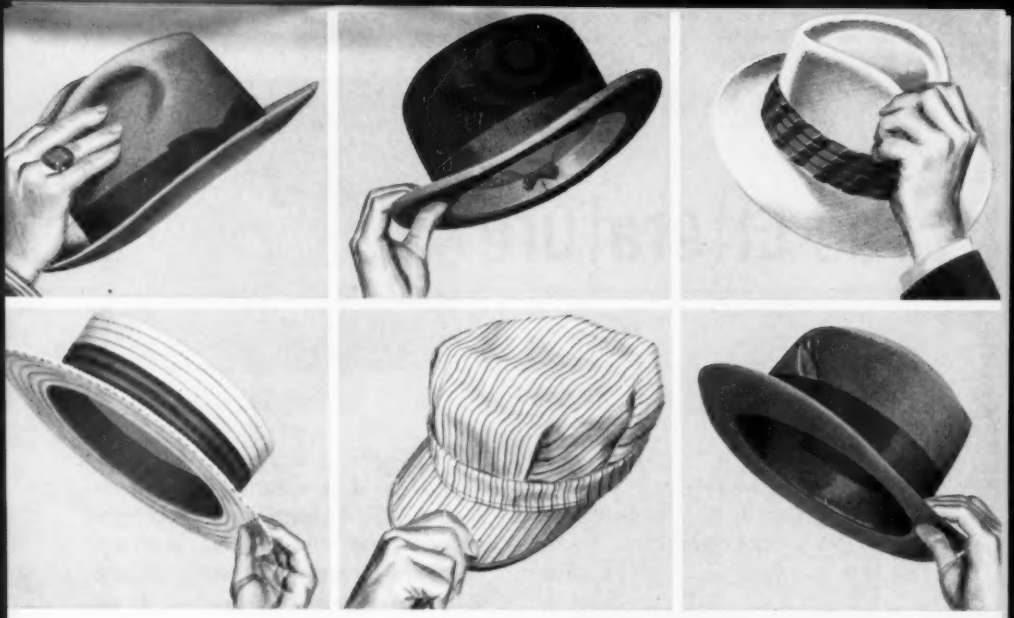
EASTMAN KODAK COMPANY
Rochester, N.Y.
Booth No. 911

ECLIPSE COUNTERBORE CO.
Detroit, Mich.
Booth No. 1121

Personnel: R. G. Michell, Sr.; H. R. White; W. A. Hassberger; I. A. Homrich; P. A. Ruprich; A. P. Smith; G. N. Schade; J. G. Ouellette; W. R. McClure; M. Leon; R. A. Parent; A. R. Gloster; R. G. Michell, Jr.
New Products: Precision end mills ground from the solid with lands form ground relieved in one operation. The web section is said to afford maximum strength and ideal rake contour.
Other Products: Interchangeable carbide tipped and high speed steel counterbores, countersinks, core drills, and back spotfacers.

Engelberg Huller Model 680 abrasive belt grinder.





Why hats are off to CIMCOOL...

...because CIMCOOL° has become, in just a few years, the largest selling cutting fluid in the world. And sales of this radically new and different coolant are continuing to climb because CIMCOOL Standard Concentrate has two big advantages over old-fashioned cutting fluids.

CIMCOOL LOWERS COSTS because it's longer lasting in machines. Thus, it reduces downtime and cuts labor costs for cleaning and changing.

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We'll be happy to supply information on the many specific advantages of CIMCOOL Standard Concentrate—or details on the entire family of CIMCOOL Cutting Fluids. Just contact us. Wire, write, or telephone Sales Manager, Cincinnati Milling Products Division, The Cincinnati Milling Machine Co., Cincinnati 9, Ohio.

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CIMCOOL **Concentrate**—The famous pink fluid which still covers 85% of all metal cutting jobs. Effective, economical and clean.

CIMCOOL **Tapping Compound**—Permits the use of highest tapping speeds and increases tap life amazingly.

CIMPLUS—The transparent grinding fluid with exceptional rust control. Also used for machining cast iron and as a water conditioner with CIMCOOL Concentrate.

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2. Stainless Steel. Crucible Steel Co. of America, Dept. MTB, Oliver Bldg., Mellon Square, Pittsburgh 22, Pa. Stainless and heat resisting steels plus a schedule of extras.

3. Tube Mills. Yoder Co., Dept. B, Cleveland 2, O. A textbook on the electric-weld process of tube manufacture. Book contains a review of the different tube making processes; and a complete description of the cold-forming, electric-weld process, its development, possibilities and limitations.

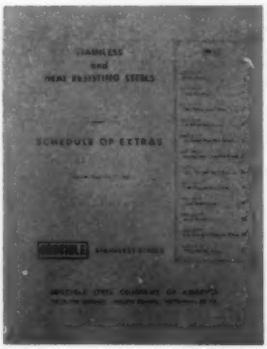
4. Turret Punch Press. Wiedemann Machine Co., Dept. TMBB, 4272 Wissahickon Ave., P.O. Box 6794, Philadelphia 32, Pa. R-61 turret punch press for fast piercing of small lot and semi-production work.

(Continued on page 198)

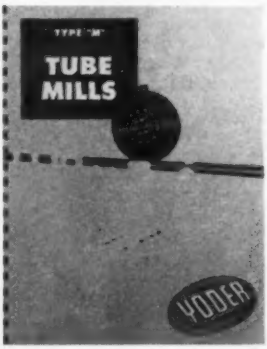
(See Number 1.)



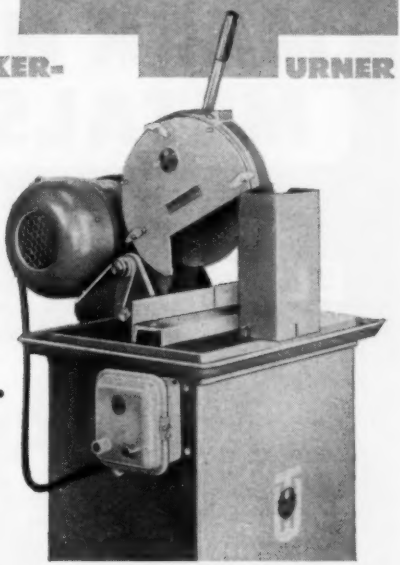
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(See Number 3.)



WALKER-TURNER



Another NEW 'Light-Heavyweight'! — cuts bars, rods, tubing . . . and production time!

This newest Walker-Turner "LIGHT-HEAVYWEIGHT" cuts true and clean — saves time with every cut and frequently eliminates finishing operations.

You can tap the cast-iron table to mount any work-holding devices, or drill for angle-mounting of the head. Also available with head factory-mounted at 45° for miter cutting.

Walker-Turner "Light-Heavyweight" Abrasive Cut-Off Machine: Capacity: 1½" round bar; 3" tubing. Abrasive wheel, 12" dia. x 3/32", on 1" spindle. 3 hp motor is fan-cooled, totally enclosed, ball-bearing, with overload capacity up to 7 hp. Guard provides 216° peripheral protection.

Ask your Walker-Turner Distributor to demonstrate what this new Cut-Off Machine will do for you. He's listed under "Tools" in your phone book's Yellow Pages. Or write for his name and complete specifications.

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walker-turner

WALKER-TURNER
Division
Kearney And Trecker Corporation • Plainfield, N. J.

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MARK HARD METALS . . .

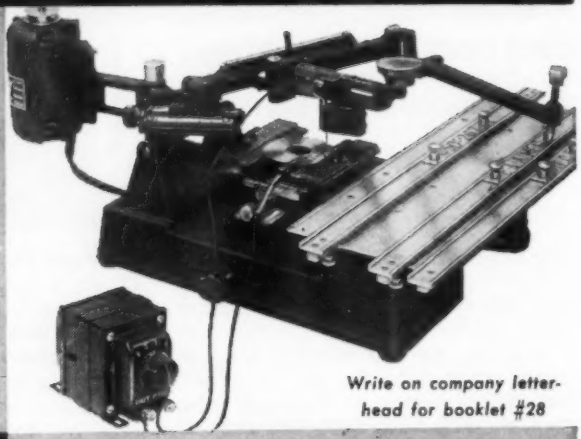
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MAR. 1956

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COMPANY .....

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NAME..... POSITION.....

COMPANY .....

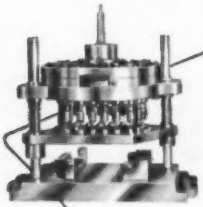
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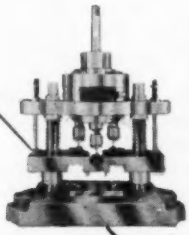
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FREE LITERATURE (CON'T)

5. Rotary Index Table. Troyke Mfg. Co., Dept. BB, Cincinnati 9, O. Roto-Indexer, the indexing table with many exclusive and time saving features.

6. Open Back Inclinable Presses. Niagara Machine & Tool Works, Dept. MTB, 683 Northland Ave., Buffalo 11, N.Y. Series E, single point obi presses with front-to-back crankshaft design.

7. Cutter Catalog. National Twist Drill & Tool Co., Dept. B, Rochester, Mich. Net price catalog of milling cutters, end mills, counterbores and hobs.

8. Tool Steel Guide. Vanadium-Alloys Steel Co., Dept. MTB, Latrobe, Pa. Guide presents technical data on more than 50 types of tool steels and cold finished products.

9. Autofeed Presses. Danly Machine Specialties, Inc., Dept. TBM, 2100 S. Laramie Ave., Chicago 50, Ill. Series H catalog describes complete line of Autofeed presses for high-speed production stamping. Capacities range from 50 to 800 tons.

10. Rotary Surface Grinder. Arter Grinding Machine Co., Dept MTBB, 15 Sagamore Rd., Worcester 5, Mass. Model E, vertical column type machine with a wheelslide, and a sliding table with a rotatable magnetic chuck.

11. Carbon Dioxide Welding. Air Reduction Sales Co., Dept. BB, 60 E. 42nd St., New York 17, N.Y. Booklet covers the process of carbon-dioxide-shielded consumable-electrode arc welding.

12. Tungsten Carbide Grades. Adamas Carbide Corp., Dept. F-18, Kenilworth, N.J. Booklet covers the complete line of tungsten carbide grades.

13. Stainless Steel Fastenings. Anti-Corrosive Metal Products Co., Inc., Dept. B, Castleton-on-Hudson, N.Y. Catalog includes stock lists, price lists and discount sheets.

14. Heavy Duty Lathe. Axelson Mfg. Co., Div. of U.S. Industries, Inc., Dept. BB, 6160 S. Boyle Ave., Los Angeles 58, Cal. Twelve important features of the 32" heavy duty lathe are presented.

15. Tubes. Tubular Products Div., Babcock & Wilcox Co., Dept. MTBB, Beaver Falls, Pa. Seamless and welded, heat exchanger and condenser tubes.

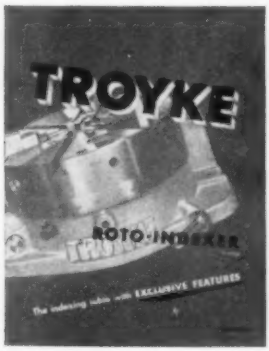
16. Occupational Deafness. Beltone Institute for Hearing Research, Dept. BB, 2900 W. 36th St., Chicago 32, Ill. A study of occupational deafness among workers exposed to loud noise.

17. Balancing Machines. Balance Engineering Co., Dept. TBM, 5030 Lake St.,

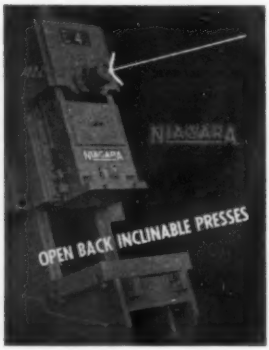
(See Number 4.)



(See Number 5.)



(See Number 6.)





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FREE LITERATURE (CONT'D.)

Chicago 44, Ill. Complete line of static and dynamic balancing machines for balancing rotating parts.

18. Turret Drills. Burg Tool Mfg. Co., Dept. MTB, 15001 S. Figueroa St., Gardena, Cal. Specifications of the five Burgmaster turret drill models. Also the Tool-Flex line of full floating tool holders.

19. Counterbores and Boring Bars. Coffey-Cummins Mfg. Co., Dept B, 16 N. Morengo Ave., Pasadena 1, Cal. Described are the Du-Bar boring bar with the welded tungsten carbide tip, and the Du-Bore counterbore.

20. Milling Machine. The Cincinnati Milling Machine Co., Dept. TMBB, Cincinnati 9, O. These Contourmaster milling machines are equipped with automatic hydraulic depth control, and manual table and cross feeds.

21. Screw Machine. The Cleveland Automatic Machine Co., Dept. B, Cincinnati 12, O. Bulletin describes the new 1⅜" and 1⅝" single spindle automatic bar machine.

22. Floor Drill. Cincinnati Lathe and Tool Co., Dept. MTBB, Cincinnati 9, O. Catalog D-143 describes the model LO 21" stationary head floor drill. Included are specifications, installation, lubrication, and operation data, and parts list.

23. Press Brakes. The Cleveland Crane & Engineering Co., Dept. TBM, Wickliffe, O. Dimensions and specifications are given for the entire standard line which range in bending capacities to 14' x ¾" mild steel.

24. Final Finishing. Complex Tools & Abrasives, Dept. BB, 2944 N. California Ave., Chicago 18, Ill. Brochure describes new methods, abrasive products and chemical compounds for final finishing of metals, sintered alloys, ceramics and crystals.

25. Drilling and Tapping Machine. The Cleveland Tapping Machine Co., Dept. MB, Canton 6, O. Described and illustrated is the Cleveland Jr. multi-spindle Drill-Tapper.

26. Milling Machine. Crowningshield-Harris Co., Dept. BB, Greenfield, Mass. Described is the new improved No. 3 hand and power feed milling machines.

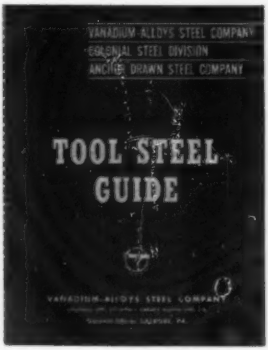
27. Grinding and Drilling Equipment. Dumore Precision Tools, Dept. MBT, 1300 17th St., Racine, Wis. Catalog covers the company's line of tool post grinders, hand grinders, automatic drilling equipment, drill grinders and accessories.

28. Surface Grinders. The DoAll Co., Dept. B, Des Plaines, Ill. A variety of

(See Number 7.)



(See Number 8.)



(See Number 9.)





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precision surface grinders and custom built special grinders are described.

29. Vises. Donovan Mfg. Co., Dept. MTBB, 80 Batterymarch St., Boston 10, Mass. Master Multi-Swivel vises are said to be valuable time savers in intricate, angular set-ups.

30. Boring Machine. Ex-Cell-O Corp., Dept. B, 1200 Oakman Blvd., Detroit 32, Mich. Specifications, operating data and a general description of the new Style 432 duplex vertical precision boring machine.

31. Interferometry. Engis Equipment Co., Dept. MB, 431 S. Dearborn St., Chicago 5, Ill. This book discusses interferometry as a method for measuring the length of gage blocks, using only the wave length of light as an absolute standard.

32. Mandrels. Erickson Tool Co., Dept. TBM, E. 23rd St. & Hamilton Ave., Cleveland 14, O. The new line of Westbert Colletmandrels are described as a one-piece mandrel, actuated in the same manner as collets.

33. Gear Grinding Machines. Gear Grinding Machine Co., Dept. BB, 3901 Christopher Ave., Detroit 11, Mich. Brochure describes the newly developed line of fully automatic gear grinding machines.

34. Control Transformers. General Electric Co., Dept. TBM, Schenectady 5, N.Y. Catalog describes control transformers along with autotransformers, machine tool transformers, and special application models.

35. Double Disc Grinder. Gardner Machine Co., Dept. MTBB, Beloit, Wis. The new 2V18 precision double disc grinder is designed to generate parallel and flat surfaces on a variety of small parts.

36. Boring Machines. Homestrand, Inc. Dept. BB, 9 Addison St., Larchmont, N.Y. Catalog describes and gives specifications on the SJ and SJB ASEA jig boring machines.

37. Collet Chucks. Hardinge Bros., Inc. Dept. TMBB, Elmira, N.Y. These speed chucks feature new ease in operation with rapid closing and opening of the collet or step chuck with a turn of the handwheel.

38. Gage Supplies. Huron Machine Products, Inc., Dept. BB, 6252 Monroe Blvd., Dearborn, Mich. Brochure describes wire type reversibles, taper locks, trilocks, plain rings, thread rings, master setting discs, and ball handles.

39. Hydraulic Feed Units. Hartford Special Machinery Co., 269 Homestead Ave., Hartford 12, Conn. Flyer describes and gives specifications of the new way type hydraulic feed units which feature thrust above the ways near the tool load.

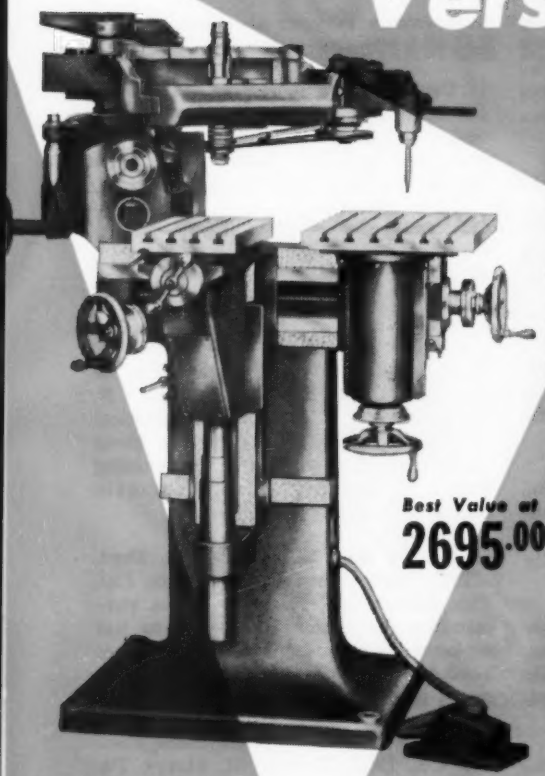
40. Jig Borer. Carl Hirschman Co., Inc., Dept. MTBB, Manhasset, N.Y. The new Hauser 3BA precision jig borer incorporates new features such as greater boring capacity, increased maximum distance, heavier quill, larger table surface and greater table travel.

41. Work Clamping Assemblies. Jergens Tool Specialty Co., Dept. BB, 712 E. 163rd St., Cleveland, O. A new strap clamping principle designed to eliminate long costly set-up sessions, insecure clamping and damage to work is announced.

42. Machine Tool Replacement. Jones & Lamson Machine Co., Dept. TTBM, Springfield, Vt. Booklet tells what new machine tool equipment will do for your company by increasing profits.

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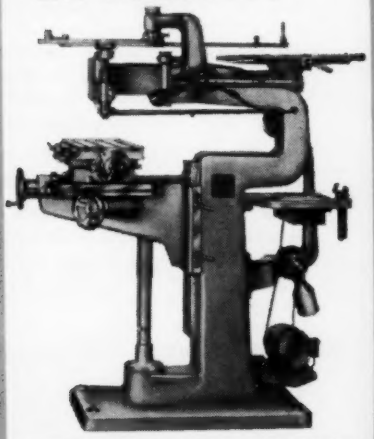
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FREE LITERATURE (CONT'D.)

43. Marking Equipment. Imperial Stamp & Engraving Co., Inc., Dept. B, 4456 N. Western Ave., Chicago 25, Ill. Marking equipment for every need is described in a new catalog covering Imperial's complete line.

44. Drawing Lubricants. S. C. Johnson & Son, Inc., Dept. MTBB, Racine, Wis. Drawing and Forming booklet gives reasons for wax's unusual lubricity and explains the benefits of wax in metal forming.

45. Vises. Illinois Metal Products, Dept. MBT, 429 W. Superior St., Chicago 10, Ill. Flyer tells how an 80% saving in vise set-up time can be had with the Imp Hold-Down vise.

46. Turret Drill Heads. Jersey Mfg. Co., Dept BB, 401 Livingston St., Elizabeth 1, N.J. The Arbo 2, automatic turret type drill head, with drilling capacity from 0 to 19/32" is described.

47. The Correlation between Screw Thread Standards and Gaging Systems, is the title of a new booklet available from The Johnson Gage Co., Dept. MTBB, Bloomfield, Conn.

48. Punch Presses. Kenco Mfg. Co., Dept. MB, 5211 Telegraph Rd., Los Angeles 22, Cal. The brochure describes the entire line of Kenco punch presses which range in capacity from 1½ to 15 tons.

49. Cemented Carbide Products. Kennametal, Inc., Dept. BB, Latrobe, Pa. The physical and mechanical properties of both Kennametal and Kentanium are described. Kentanium is an engineering material for use at elevated temperatures.

50. Extruded Sections. Jones & Laughling Steel Corp., Dept. MBT, 3 Gateway Center, Pittsburgh 30, Pa. Hot extruded and cold drawn extruded sections, tailor made to your specifications are described in a new folder.

51. Cemented Diamond Particles. Koebel Diamond Tool Co., Dept. B, 9456 Grinnell Ave., Detroit 13, Mich. A newly developed product, called CDP, cemented diamond particles is described.

52. Needle Rollers. The Kaydon Engineering Corp., Dept. MTBB, Muskegon, Mich. An engineering catalog on precision needle rollers complete with charts and formulae is available.

53. Aluminum. Kaiser Aluminum & Chemical Sales, Inc., Dept. BB, 919 N. Michigan Ave., Chicago, Ill. Technical data and tooling information is given in a new booklet titled "Machining Kaiser Aluminum with Automatic Screw Machines."

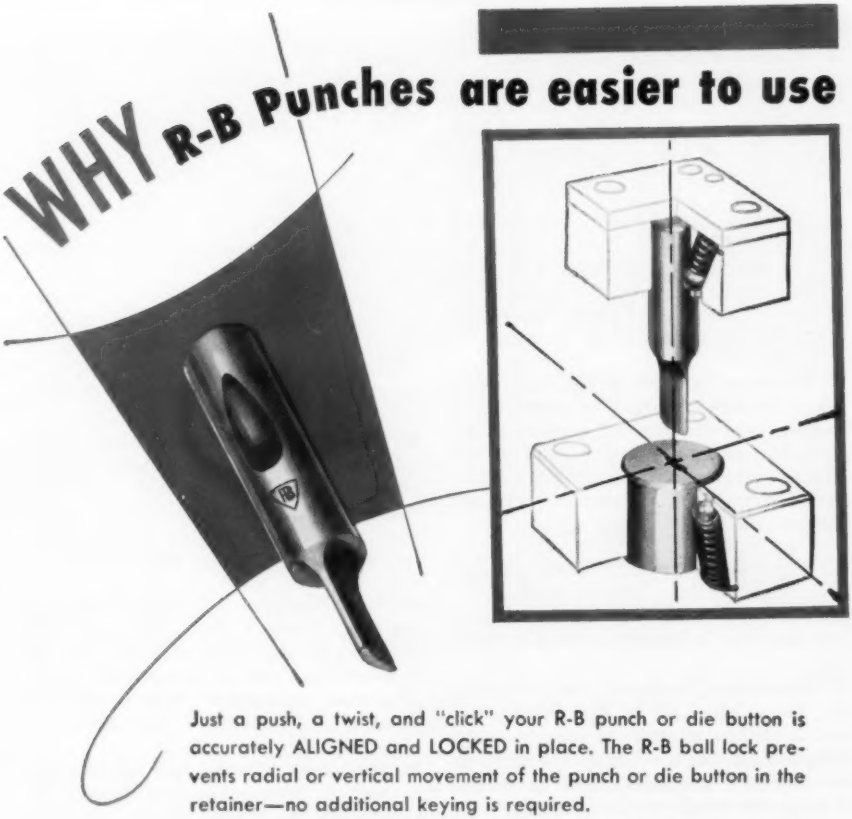
54. Boring Bar. KDK Products, Dept. MTBB, 3010 Tweedy, South Gate, Cal. This boring bar is said to be an outstanding development in that one bar replaces all other bars. Seven bar sizes available ranging from tool maker's needs to heavy engine lathe boring.

55. Powder Metallurgy. Keystone Carbon Co., Dept. BBMT, St. Marys, Pa. Bulletin includes a summary of the powder metallurgy process, designing for powder metallurgy, typical applications, and facilities of the company.

56. Metalworking Machine. J. F. Kidder Mfg. Co., Inc., Dept. TBM, 426 Colchester Ave., Burlington, Vt. The Little Blacksmith No. 55 machine is available with attachments for punching, notching, bending, angle shears, etc.

57. Hydraulic Cylinders. Lindberg Air and Hydraulic Div., Teer-Wickwire & Co., Dept. B, 1801 Wildwood Ave., Jackson, Mich. Bulletin 701 describes the complete line of Lindberg hydraulic cylinders.

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FREE LITERATURE (CONT'D.)

58. Lattice Mountings. Lord Mfg. Co., Dept. TMBB, 1635 W. 12th St., Erie, Pa. These mountings are designed to solve problems of low frequency, high amplitude vibrations in heavy industrial machinery.

59. Welding. The Lincoln Electric Co., Dept. BB, Cleveland 17, O. There are four types of arc available from one welder with the new Idealarc. This machine gives both current and voltage control in both ac and dc welding.

60. Reamers. Lavallee & Ide, Inc., Dept. BB, Chicopee, Mass. The comparative reamer selector catalog combines the style and net price information of the former selector with complete dimensional data on all standard reamers, blanks and cutters.

61. Silver Brazing. Lucas Milhaupt Engineering Co., Dept. TMB, Cudahy, Wis. This booklet deals with the problems and solutions in the silver brazing field.

62. Alternator Systems. Leece-Neville Co., Dept. MB, 1374 E. 51st St., Cleveland 3, O. The alternators are expressly designed for fleets of small trucks used for delivery purposes, and by fleets of over-the-road trucks as well.

63. Metal Working Machine. Tech-Pacific, Dept. B, Newport Beach, Cal. The G-V, model 285B universal sheet steel and plate working machine is described along with specifications and capacities.

64. Portable Pipe Threader. Lawco, Inc., Dept. TBMM, 217 W. 2nd St., Hutchinson, Kan. The Lawco, Jr., portable power pipe threader is described. It weighs 20 pounds and threads ¼ to 4" in seconds.

65. Micro-Drilling. Louis Levin & Son, Inc., Dept. MB, 3610 S. Broadway, Los Angeles 7, Cal. Sphinx Micro-Drills for instrument work, automatic screw machines and watchmakers, along with a micro-drilling attachment and a micro-drill press are described.

66. Baling Presses. Logemann Bros. Co., Dept. TBM, Milwaukee, Wis. The complete line of double and triple compression metal balers, and scrap presses are described.

67. Foot Switches. Linemaster Switch Corp., Dept. BMT, Woodstock, Conn. The complete line of foot switches is described in a new detailed catalog.

68. Hand Riveter. Lemert Engineering Co., Inc., Dept. B, 204 E. Jefferson St., Plymouth, Ind. Bulletin 86P covers the rotating impact spinner-riveter hand gun and other models of the all-pneumatic Airflex portable series.

69. Heat Treating. Lindberg Engineering Co., Furnace Div., Dept. MTBB, 2444 W. Hubbard St., Chicago 12, Ill. A practical guide to assist those planning new, enlarged or redesigned heat treating departments is available.

70. Machinery Movers. Acorn Co., Dept. B, 1482 S. Milwaukee St., Denver 10, Colo. With the Mighty Mover one man can easily and quickly move heavy machinery in hours instead of days.

71. Milling Machine. Pratt & Whitney Div., Niles-Bement-Pond Co., Dept. MTBB, West Hartford 1, Conn. The BL 3622 model C, Keller automatic tracer-controlled milling machine, designed for added productive capacity is described.

72. Time & Energy Analyzer. Stewart Instrument Co., Dept. BMT, 6507 Grand River Ave., Detroit 8, Mich. This portable analyzer determines machine utilization, best cutting tool, machinability index, horsepower at the tool, etc.

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FREE LITERATURE (CONT'D.)

73. Rotary Tables. The John B. Stevens Co., Dept. B, Somersville, Conn. The complete line of standard and dial type rotary tables are described.

74. Alloy Steels. Sheffield Steel Div., Armco Steel Corp., Dept. MTBB, Houston, Tex. The brochure describes Sheffield's low-alloy, high-strength steels, and Sheffield's Shef-Ten and gives a graphic description of quality controls, starting with raw materials.

75. Socket Set Screws. Standard Pressed Steel Co., Dept. TMBB, Jenkintown, Pa. The Unbrako line of high-torque, self-locking socket set screws is described in a new catalog.

76. Drill, Reamer and Tap Chucks. Scully-Jones and Co., Dept. BB, 1901 S. Rockwell St., Chicago 8, Ill. Bulletin 1-50 describes a newly designed line of drill, reamer, and tap chucks which uses the 4-slot design.

77. Grinding Wheels. Simonds Abrasive Co., Dept. BBMT, Philadelphia 37, Pa. The Simex reinforced red wheels, which are lightweight and extra strong for tough grinding jobs, are described.

78. Lathes and Grinders. The Springfield Machine Tool Co., Dept. MT, Springfield, O. A new literature series covers the new model 280 and model S lathes, and the line of vertical universal grinders.

79. Lubricants. Sun Oil Co., Ltd., Dept. TMBB, 600 University Ave., Toronto 2, Ont. Bulletin No. 40 describes Sun 844X grease, which can be used at temperatures up to 250°F.

80. Sanding and Polishing Machines. The Nedco Co., Dept. BB, 88 Rumford Ave., Waltham 54, Mass. Bulletin describes and illustrates the line of portable electric sanding and polishing machines.

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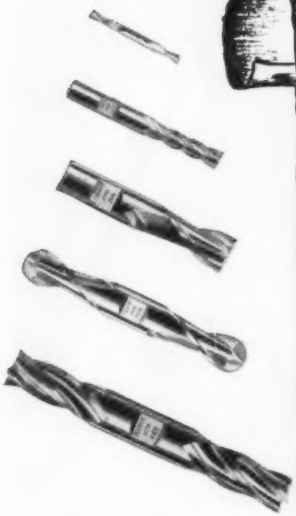


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New Products: Model HN heavy duty Fenway hand portable electric nibbler which cuts eight gauge mild and ten gauge stainless steel at the rate of 50 inches per minute without distortion on either side of the cut.
Other Products: Metal disintegrators; Readepth micrometer dial indicating depth gages; Easco etcher and demagnetizer.

ELECTRO-MECHANO CO.
Milwaukee, Wis.

Booth No. 1228

Personnel: W. E. Lueders; A. H. Olofson.
New Products: Model 603, ½ hp automatic drilling unit; improved Model 601, 16" precision drill press; Model 113, ¼" capacity automatic drilling unit. Model 603 has electric motor driven spindle and hydraulically controlled, air operated quill feed. The spindle feed and speed are under separate control for any combination of feed to speed. The spindle travel is powered by an in-line



AUTOMATION WITH ARO PAR-A-MATIC DRILLS

Speeds Drilling for Tecumseh Products Co.

Drilling six holes at a time in a compressor piston with ARO Par-A-matic Drills helps Tecumseh Products Co., Tecumseh, Mich., increase output, reduce man-hours.

A group of Par-A-matics will drill any number of holes simultaneously . . . often in *less time* than would be needed for a single hole. Set-up adjustments are fast and easy. Air-operated . . . adjustable stroke length . . . variable rate of feed. Write for bulletin 5546-T.

THE ARO EQUIPMENT CORPORATION
Bryan and Cleveland, Ohio
Aro of California, Los Angeles 7, California
Aro Equipment of Canada, Ltd., Toronto 15, Ontario
Offices in All Principal Cities

ARO ® **AIR TOOLS**
Also . . . AIR HOISTS . . . LUBRICATING EQUIPMENT . . . AIRCRAFT PRODUCTS . . . GREASE FITTINGS

Encircle No. 332 on Card, Opposite Page 65

double acting air cylinder. Feed rate is controlled by a closed hydraulic system. An induction type motor with variable sheaves provides stepless speed from 600 to 4000 rpm.

ELGIN NATIONAL WATCH CO.
Elgin, Ill.

Booth No. 1101

ELOX CORPORATION OF MICHIGAN
Clawson, Mich.

Booth No. 574

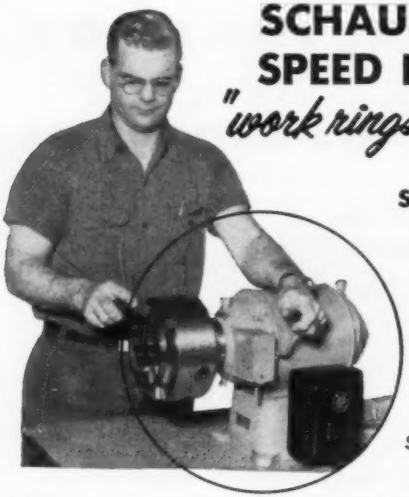
ENCO MFG. CO.
Chicago, Ill.

Booth No. 651

Personnel: Nathan Usiskin; Gordon Benes; Gerald Karlen; Robert Herren; Pete Sims; William Sander; William Wilson; George Mattusch; Charles Sherman; Eric Edstrom; Dan Featherstone; Gordon Benes, Jr.; Chester Loda; Charles Corn.

New Products: Model 220 Tiny-Titan combination magnetic base lighting unit with magnifier. Magnetic pull is 65 lb. Magnifier is 2" in diameter, double-lens, 5X power. The magnifier may be turned at any angle or plane. Lighting unit has rayon-flocked shield.

Other Products: Lathe turrets—turret tool posts, hexturret bed turrets, and tailstock turrets; Tiny-Titan magnetic base tools—indicator holders, lighting units, magnifiers.



SCHAUER SPEED LATHES
"work rings around"
OTHER SECONDARY FINISHING METHODS

Stoning hardened steel ring with Schauer Type NA2B Speed Lathe.

These versatile, low-cost machines provide the fastest, most economical method of filing, deburring, polishing or lapping metal and plastic parts. There's a Schauer Speed Lathe to solve practically any secondary finishing problem. Many sizes and models with holding devices to suit the job. *Speed your production* with Schauer Speed Lathes. Write for Catalog No. 530.

See Schauer Speed Lathes at the ASTE Industrial Exposition, Booth No. 152, International Amphitheatre, Chicago, March 19-23.

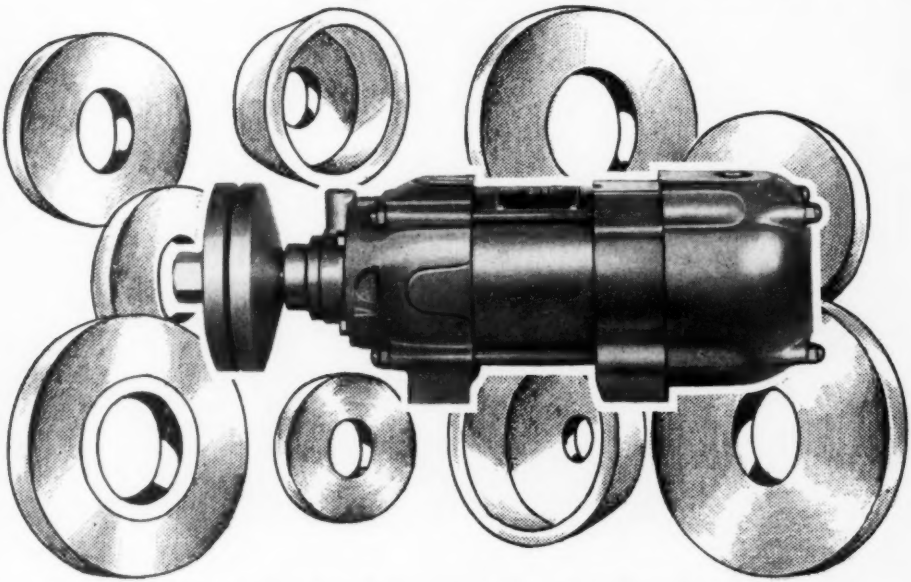
SCHAUER MANUFACTURING CORP.
4502 Alpine Ave. • Cincinnati 36, Ohio

Encircle No. 333 on Card, Opposite Page 65

Serving the Industry Since 1852

POSITIVE POWER

with a WOODS MOTOR ARBOR



Rugged as a block of New England granite—smooth running as a Kentucky Derby winner—operates at a cost to win the approval of any Scotchman. This description applies to any WOODS Motor Arbor.

Precision built and "tape insulated," WOODS motors are available in a wide variety of types and range from one to one hundred horsepower. Extremely adaptable for use requiring precision balance, a minimum of space and delivering the maximum of power. Why not investigate the advantages of these time-and-money saving motor arbors for your plant today?

Send for descriptive material

MOTOR DIVISION

S. A. WOODS MACHINE CO.
27 DAMRELL STREET
BOSTON 27, MASS.

Encircle No. 2A on Card, Opposite Page 65



Expensive parts machined to close tolerances are always in danger of being scratched by jagged chips hiding in the weave of ordinary wiping material. Such parts have to be reworked . . . or scrapped entirely.

This wiping job could cost $50



Easy to distribute . . .
always a clean one handy



They really soak up oil . . .
good for solvents, too



When thoroughly used . . .
toss 'em in the trash



When you use Scott Wipers, chips don't come back to scar men and metal . . . there's always a clean new wiper handy. You use one thoroughly and throw it away. No more collection, sorting, laundering, distribution.

. . . this one cost less than ½¢

The difference is . . . Scott Wipers

Strong, highly absorbent Scott Wipers are reducing wiping costs everywhere. Yet they cost so little you can throw them away after a single use when the job calls for a clean wiper free of chips and abrasive material.

This is sanitary wiping. No danger of cuts from hidden chips . . . no fear of skin infection from dirty wipers.

Your Scott man is ready to demonstrate any time you say. Call today or mail this coupon.

Scott Paper Co., Dept. MT
Chester, Pa.
Send information on Scott Wipers.

Name_____

Company_____

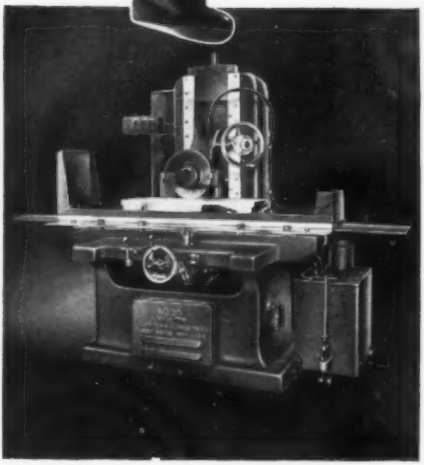
Position_____

Address_____

FOUND WHERE WORLD FAMOUS AIRCRAFT ARE "BORN"

GRAND RAPIDS GRINDERS





GRAND RAPIDS NO. 55 HYDRAULIC FEED SURFACE GRINDER
This precision tool room type machine has table speed up to 125 fpm. Working surface of table is 12" x 36". Vertical movement of wheel head 18". Preloaded ball bearing spindle greased for life. Spindle speeds 1925 and 2500 rpm.

Just take a look in their toolrooms! Every one of these famous aircraft manufacturers uses Grand Rapids Grinders . . . engineered and built for unusual long life of precision grinding. Our Model 55 shown here, for instance, features column and base of massive, one-piece casting for vibrationless rigidity and permanent alignment. Both longitudinal table travel and cross feed are hydraulically actuated. Wheel head has powered rapid vertical travel. Table speed is variable up to 125 fpm . . . faster than any other of this type and size.



Just a note on your letterhead will bring you full details.

GALLMEYER & LIVINGSTON

GALLMEYER & LIVINGSTON COMPANY 405 Straight Ave., S.W., Grand Rapids, Michigan

Encircle No. 2D on Card, Opposite Page 65

ENGELBERG HULLER CO., INC.
Syracuse, N.Y.

Booth No. 1221

Personnel: John T. Schenck, pres.; Leo Schaller, vice-pres.; John Simmons, product. mgr., James Kraeger, Nick Chochran, Howard Miller, sales engineers.

New Products: Four-head Model 680 conveyor-type abrasive belt grinder. For wet or dry grinding and polishing of ferrous, nonferrous, plastic and other materials. Especially suitable for grinding and deburring flat surfaces on a high production basis.

Other Products: Model BG8/FT9 platen type abrasive belt grinder; Model L-4 centerless abrasive belt grinder; Model 648 utility platen type abrasive belt grinder; Model CN-2 utility bench type abrasive belt grinder.

ENGIS EQUIPMENT COMPANY
Chicago, Ill.

Booth No. 1020

EQUIPTO DIVISION, AURORA EQUIPMENT CO.
Aurora, Ill.

Booth No. 728

Personnel: Paul Streit; Harry Dixon; John Dunham; Robert Wallin; Ralph Zettinger; Al Loser; Floyd Keck; Richard Sitler; Ted Hilgen.

New Products: Small drawer machine

Rotary Broaches Produce
PERFECT HOLES

ROTARY BROACHES PRODUCE PERFECT-HOLES • ROTARY BROACHES PRODUCE PERFECT-HOLES • ROTARY BROACHES PRODUCE PERFECT-HOLES •

tool cabinet.
Other Products: Steel shelving; steel lockers; shop equipment; drawer units; work benches.

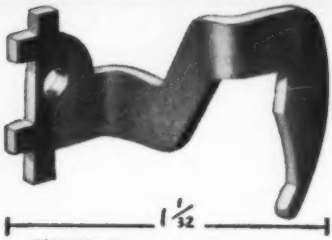
ERCONA CORP., representing CARL ZEISS JENA
New York, N.Y.
Booth No. 1013
Personnel: Henry Berman; Bernard Friedman; Morton Padnos; Charles H. Frank, Jr.; David Harris.
New Products: Toolmakers' microscope; camshaft tester; protection optimeter; small optical dividing head.
Other Products: Indicating micrometers and snap gages; comparators; surface finish analyzer; optical dividing heads; optical bevel; optical protractor level.

ERICKSON TOOL CO.
Cleveland, O.
Booth No. 652
Personnel: J. D. McMahon; G. F. Bennett; A. G. Jenkins; Frank Winnen; Nelson Dailey; Geo. Frei; C. K. Higley.
New Products: Master spacer.
Other Products: Collet chucks; adjustable and full floating holders; air chucks; air cylinders; expanding mandrels; speed indexers; bar feeds; boring bars; collet mandrels.

ESBEC BARREL FINISHING CORP., THE
Byram, Conn.
Booth No. 768
Personnel: Morris S. Shipley, pres.; Wm.

STAMPINGS
IN SMALL LOTS

This sketch briefly describes the cost of typical parts made for one of our earliest customers, whom we have served for the past thirty-four years.

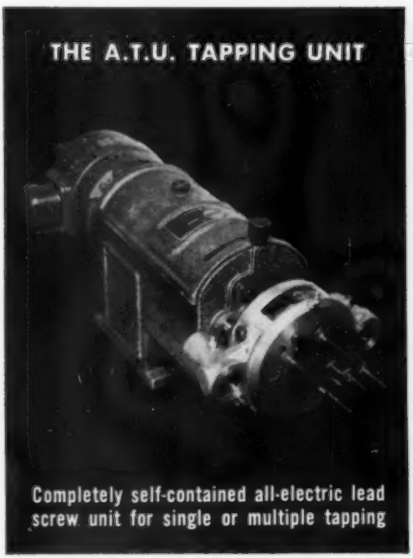


EXAMPLE
MAT'L. C. R. STEEL
The cost of blanking, piercing and forming, including all tools:
First 100 ..... $69.25
Each add'l. 100 ..... 4.50
Plus actual cost of material used for stampings.

We have the nation's very best facilities and know-how to produce short-run stampings at the lowest possible cost. Send your sketch, blueprint, or part, plus quantity, for prompt quotation.

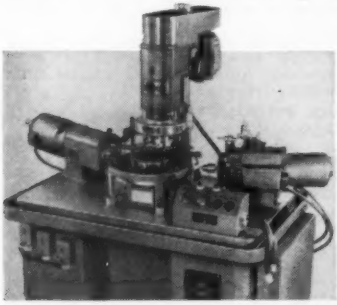
DAYTON ROGERS
Manufacturing Company
MINNEAPOLIS 7C, MINNESOTA

Encircle No. 335 on Card, Opposite Page 65





NEW ETTCO'S Tapping and Drilling Twins ... the versatile combination that solves your small hole problems



A high-production, special purpose combination drilling-tapping machine built entirely from standard Ettco units and components.

NOW—two separate self-contained, built-for-the-purpose units that meet most single or multiple drilling and tapping requirements.

Both units have been designed for extra power, speed and rigidity to insure greater precision at high production rates.

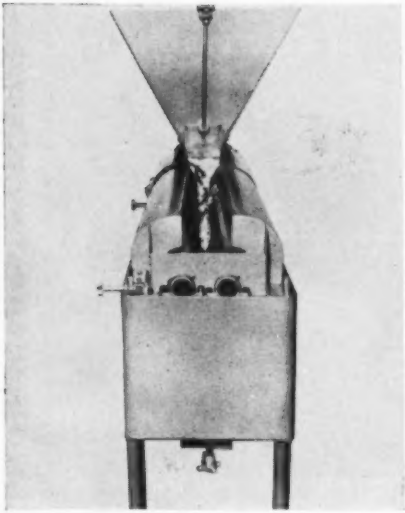
Ettco's Tapping and Drilling Twins are available as individual units or as standard upright machines. They can also be built into automatic drilling and tapping machines simply by mounting them in any desired combination on a standard base. ***Write for details—today.***

"See your Authorized Ettco Distributor"

ETTCO TOOL CO., INC.
596 Johnson Ave., Brooklyn 37, N. Y.
Chicago • Detroit • Los Angeles • Indianapolis

Ettco-Emrick
the right equipment for every small hole drilling and tapping need.

Encircle No. 336 on Card, Opposite Page 65



Esbec dimensional separator. (See page 218.)

A. Biebel, vice-pres.; C. G. Carten, production mgr.

New Products: Dimensional separator will make difficult separations which cannot be made either magnetically or by vibrating screen. Eliminates many hand operations.

Other Products: Three tumbling barrel models; color-identified barrel finishing compounds; Perfecut tumbling chips.

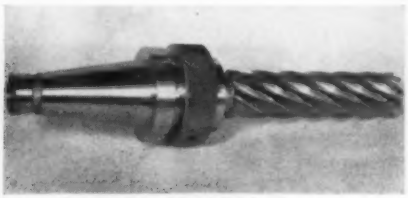
FALCON TOOL CO.
Detroit, Mich.

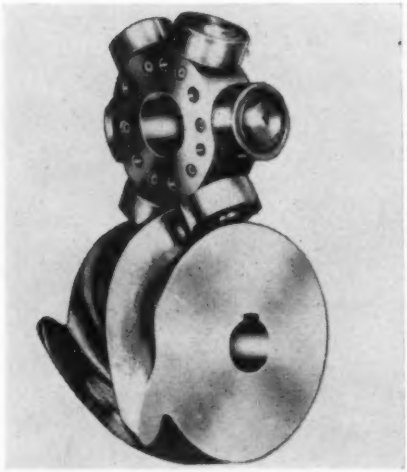
Booth No. 812

Personnel: Ralph A. Edens; Leroy S. Rawson; Cass Prisbe; Orville Knaus; Gustafson Bengtsson; Ray Pearce; F. Hudec; V. M. Schafer; V. M. Peterson; Richard A. Garber; H. Shearer; Luther Hospelhorn; Al Stoner; Leonard Frantz.

New Products: Kwiklok quick change holders, adapters, and end mills with t.i. drive integral. Used on boring mills,

Kwiklok quick change holder with end mill locked in, Falcon Tool Co.





Ferguson roller gear drive. (See page 225.)

jig borers, milling machines and radials. Radius and chamfering tool of new design.

Other Products: End mills.

FARRAND OPTICAL CO., INC.
New York, N.Y.

Booth No. 169

FEDERAL MACHINERY SALES CO.
Chicago, Ill.

Booth No. 392

Personnel: S. B. Booz, pres.; H. A. Paine, vice-pres.

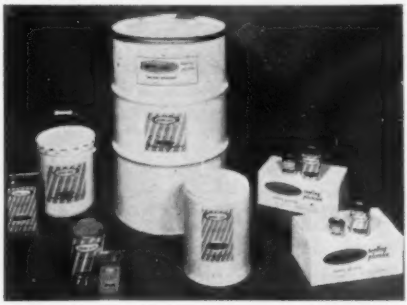
New Products: Jay-Dee attachment for eliminating tap breakage. This is a combination quick-change chuck and torque-tap driver.

FEDERAL PRODUCTS CORP.
Providence, R.I.

Booth No. 496

Personnel: L. B. Colt; S. DeGroff; L. O.

Epocast tooling plastics, Furane Plastics, Inc. (See page 226.)



FOR HIGHEST PRODUCTION . . .
BEST PERFORMANCE . . . . . .
FAST DELIVERY of REAMERS . . .
Largest IN-STOCK Selection



To assure you of increased production . . . smooth chatter-free cutting action . . . more reamed holes per grind . . . longer reamer life . . . holes that are extremely accurate and having finest finishes . . . your local W & B distributor stocks a complete line of high speed reamers.

In the complete W & B line you will find reamers of every type. Each type is designed from years of experience to provide you with highest efficiency reaming on specific jobs. "There's A Big Difference In High Speed Reamers" . . . Look to W & B for that difference!

Call your W & B distributor for quick delivery of in-stock reamers that will best meet your needs. For reamer literature or additional information, write direct.

NO. 262 B . . .
Hercules Straight Shank Chucking Reamers.

NO. 287 . . .
Hercules Taper Shank Chucking Reamers.

NO. 286 . . .
Hercules Straight Shank "Altercut" Chucking Reamers.

NO. 251 . . .
Hercules Taper Shank Jobbers' Reamers.

NO. 266 . . .
Hercules Stub Screw Machine Reamers.

W&B *"Makers of Fine Tools Since 1848"*

WHITMAN & BARNES

40045 PLYMOUTH ROAD • PLYMOUTH, MICHIGAN

NEW YORK • CHICAGO • LOS ANGELES

Encircle No. 337 on Card, Opposite Page 65

Heinold; I. A. Hunt; T. L. Johnson; H. F. Joslin; R. A. Souler; F. C. Tanner; G. H. Wilson; J. Worthen.

New Products: Control gages for automation; electronic gaging system; millionth comparator, calibrated in and accurate to one millionth of an inch; Distometer, long range precision indicating device for accurate control of machine carriage travel.

Other Products: Automatic sorting gages; automatic machine control gages; Dimensionair air gages and equipment; Arnold grinding gages; dial indicators; dial indicator gages.

FEDERAL TOOL & MFG. CO.
Minneapolis, Minn.

Booth No. 170

Personnel: E. J. Skramstad; W. L. Connel; N. W. Lund; Gilbert Barber; Herbert Chandler.

Products: Samples of stampings, short run process, will be displayed. Included are parts stamped out of steel, stainless steel, aluminum, copper base alloys and phenolics.

FELLOWS GEAR SHAPER
Springfield, Vt.

Booth No. 544

Products: No. 12H lead measuring instrument; No. 12M involute measuring

Look into the complete, cost-cutting **LOVEJOY** *line. Standard tools are in stock – to help you increase production, save time and money now!*



INSERTED-TOOTH MILLING CUTTERS

Face, side, end, slotting and boring mills.

H. S. S., CARBIDE, ALLOY BLADES

Interchangeable in all Type "A" milling cutters from 4½" to 24" in diameter.

NEW! SET-SCREW TYPE END MILLS

And new Type "Z" slotting cutters provide maximum axial and radial adjustment.

Boring Tools · Arbors · Flywheels
Lovejoy Milling Cutter · Assembly Gage

Special cutters are a Lovejoy specialty

Write for new catalogs: No. 31 (Face Mills), No. 32 (Side Mills), No. 33 (Arbors).

136 MAIN ST., SPRINGFIELD, VERMONT

See them at the show!
BOOTH NO. 184
A.S.T.E. SHOW

LOVEJOY TOOL COMPANY, INC. Ltc
SPRINGFIELD, VERMONT, U. S. A.

Encircle No. 338 on Card, Opposite Page 65



BOSTON GEAR now offers
441 Standard Stock Sizes of

20° PRESSURE ANGLE GEARS

Every engineer knows the mechanical advantages of the 20° P.A. tooth form. It's the standard for automotive drives, and wherever highest efficiency, with economy of space, weight, and cost are essential. Now, BOSTON GEAR has the answer to the question of *availability*.

THE BOSTON GEAR CATALOG lists a full range of *standard stock* 20° Spur, Bevel, and Miter Gears, available from BOSTON GEAR Distributors. Practically all your drives can now be planned for 20° P.A. gears.

Start making this big saving. For details, call your nearby Distributor, or write: Boston Gear Works, 81 Hayward St., Quincy 71, Mass.

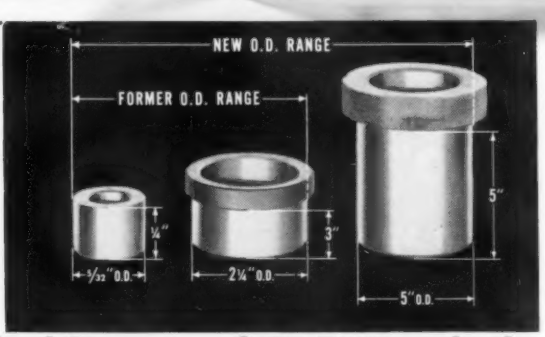
7124 "OFF-THE-SHELF" TRANSMISSION PRODUCTS

LOCAL STOCKS
FACTORY PRICES

Call your **BOSTON** *Gear* **DISTRIBUTOR**

Encircle No. 339 on Card, Opposite Page 65

To Save You HOURS of Detailing Time...



A New Extended Range of O. D. Symbol Listings For ECONOMY *Bushings*

ECONOMY'S new "Dimensional Data Sheet No. 7-A" includes an *extended range* of Standard Drill Jig Bushings by symbol listings up to 5" O.D. by 5" in length.

This eliminates all need for detailing. You specify by symbol and hole size only.

Ask for "Dimensional Data Sheet No. 7-A" TODAY!

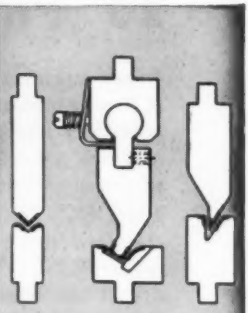
ECONOMY TOOL & MACHINE CO. 1829 SOUTH 68TH STREET MILWAUKEE 14, WISCONSIN

Encircle No. 340 on Card, Opposite Page 65

CHICAGO **INDUCTION HARDENED PRESS BRAKE DIES**

for greater die life at no extra cost on any make of press brake

Whether it is a simple die for angle bending or the more complex dies for any of the combined bending and forming operations, CHICAGO induction-hardened dies offer bonus performance at no extra cost. Field reports on these dies show better than ten times the useful life of the conventional dies used in press brakes. Get the full particulars on CHICAGO dies for your next press brake job.



Heavy lines indicate hardened surfaces

4915 **Steel Bending Brakes for over 50 Years**

DREIS & KRUMP MANUFACTURING COMPANY

CHICAGO STEEL BENDING BRAKES BOX and PAN BRAKES PRESS BRAKES

7449 S. Loomis Boulevard, Chicago 36, Illinois

Encircle No. 341 on Card, Opposite Page 65

instrument; No. 20M red liner; No. 4 fine-pitch red liner; No. 12CTR inspection instrument; automatic pinion checker.

FENN MFG. CO.
Hartford, Conn.

Booth No. 346

Personnel: A. T. Scattergood

FENWAY MACHINE COMPANY
Philadelphia, Pa.

Booth No. 937

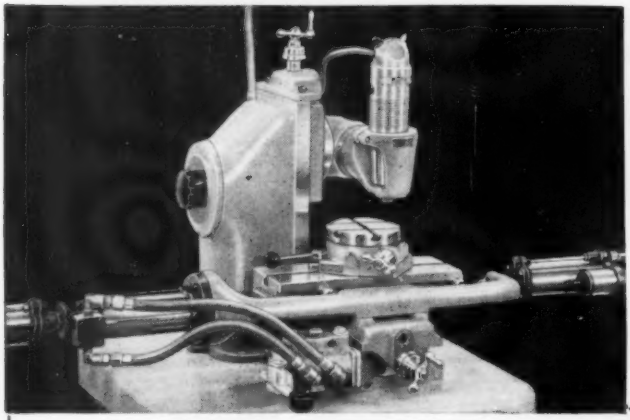
FERGUSON MACHINE & TOOL CO.
St. Louis, Mo.

Booth No. 350

Products: Intermittor, a precision index table attaining speeds as high as 30,000 pieces an hour; standard straight line transfer machine for more complicated automatic assembly—the Trans-O-Mator; Ferguson drive, a cam indexing mechanism for production machinery employing intermittent motion. The drive consists of a hardened and ground cam with a tapered rib and a hub with preloaded ball bearing followers. The special configuration of the cam rib results in a mechanism with modified trapezoid acceleration characteristics.

WM. H. FIELD COMPANY
South Boston, Mass.

Booth No. 302





SUPER 60

Stop wasting BIG machines on small parts!

Precise High RPM Milling Machines are designed specifically for machining small parts to extremely close tolerances. Operating at 15,000 to 45,000 RPM with a full ½ H.P. motor, and accurate to .0001", they provide the speed, accuracy, and sensitivity necessary to get perfect results with small diameter abrasive wheels or tungsten carbide tools. With Precise High RPM Milling Machines, you can not only save time and tooling expense, but also free larger machines for more suitable work and greatly improve the quality of small parts.

PRECISE SUPER 30 GRINDER MILLER



Attach this ad to your letterhead for FREE demonstration or literature!

PRECISE PRODUCTS CORPORATION
1331 CLARK STREET, RACINE WISCONSIN MT-3
Quality and precision since 1882

Precise

Encircle No. 342 on Card, Opposite Page 65

FIRTH STERLING INC.
Pittsburgh, Pa.

Booth No. 528

Personnel: T. G. Barnes; E. W. Kalb; J. M. Stokes; M. L. Backstrom; R. J. Zale; M. F. Judkins; T. E. Pickering; R. O. Valoon; R. H. Ashcraft; S. A. Barnes; R. G. Bright; J. D. Doherty; J. Ebner; E. E. Lindberg; P. A. McMahon; R. V. Ringquist.
New Products: TXH; Zirconium; Borides; Method X tool sharpener.
Other Products: High speed steel; tool and die steel; high temperature alloys; stainless specialties; sintered carbides; chromium carbides; heavy metal.

FLYNN MFG. CO.
Detroit, Mich.

Booth No. 500

Personnel: Mr. Kerstetter; Mr. Whittaker.
Products: Boring heads.

FONDA GAGE CORP.
Stamford, Conn.

Booth No. 1011

Personnel: E. Parks

FURANE PLASTICS INC.
Los Angeles, Calif.

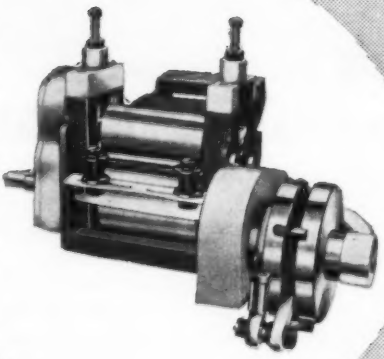
Booth No. 165

Personnel: Rex Brookhart, sales mgr.;

* "RFC"
fits any press

Yes, ROLL-FEED Provides a complete line of precision Feeds, ready for mounting for all types of presses. Adaptable for use on bench or pedestal type power presses. Comes complete with adjusting disc, mounting bracket and connecting linkage.

Can't slip . . . each wedge has four points of contact to safeguard accuracy. Feeds in thousandths . . . amazingly accurate stock movement assured. Reverses instantly. Maintains original setting . . . regardless of use or wear. No ratchets or pawls to wear down and "throw off" feed spacing. Write for illustrated folder giving specifications.



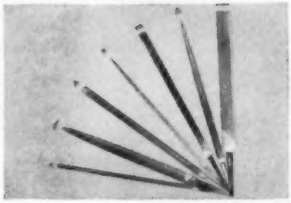
* Roll-Feeds Corporation
ASHTON, R. I.

Encircle No. 343 on Card, Opposite Page 65

PRECISION FILES FOR PRECISION WORK...

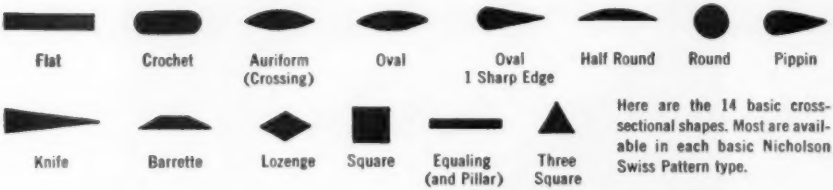
THE STORY OF TRADE X.F. MARK

NICHOLSON X.F. SWISS PATTERN FILES



There are hundreds of types and sizes in the Nicholson's Swiss Pattern "family." You'll find Nicholson X.F. (*EX*tra *F*ine) files especially developed for precision work in your shop.

Nicholson Swiss Pattern files are made to extremely exacting standards. Many have the same general shapes as American Pattern files, but are thinner and more finely shaped. They come in a greater variety of shapes and sizes, and in *six* degrees of fineness, instead of the three found in American Pattern files.



Here are the 14 basic cross-sectional shapes. Most are available in each basic Nicholson Swiss Pattern type.

Your Industrial Salesman will gladly tell you more about how Nicholson Swiss Patterns can increase filing efficiency in your shop.

NICHOLSON U.S.A. NICHOLSON FILE COMPANY, PROVIDENCE, R.I.
(In Canada: Nicholson File Company of Canada Ltd., Port Hope, Ontario)
BLACK DIAMOND U.S.A.

NICHOLSON FILES *A FILE FOR EVERY PURPOSE*

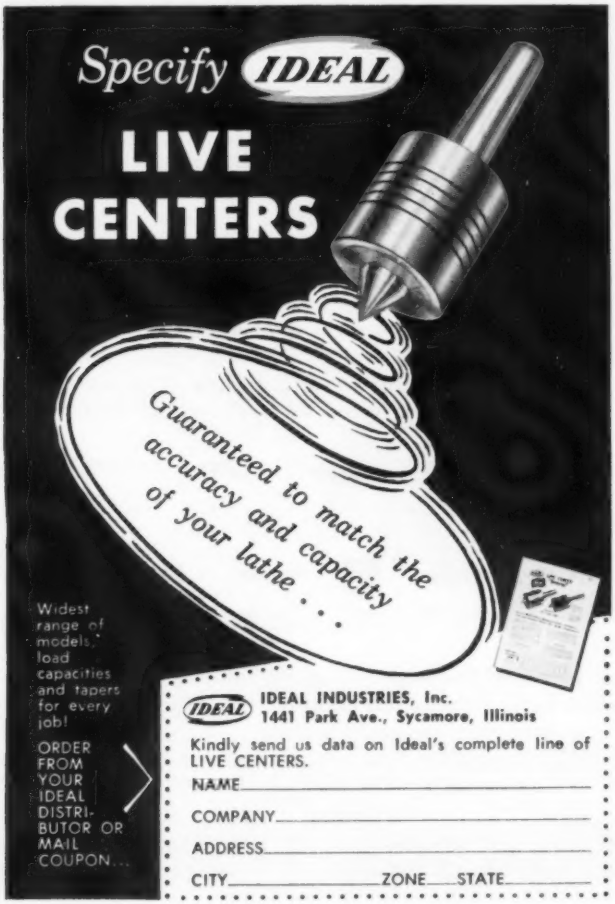
Encircle No. 344 on Card, Opposite Page 65

B. J. Bryan, tool eng.; Eli Heick, Russ Ralph, rep.
New Products: Epocast ZC Thixotropic laminating resin; Epocast 2D laminating resin.
Other Products: Plastic tooling resins for the aircraft and automotive industries.

GAERTNER SCIENTIFIC CORP.
Chicago, Ill.
Booth No. 1126

GAIRING TOOL CO., THE
Detroit, Mich.
Booth No. 1519
Personnel: E. Bemb; B. O'Meara; Wm. B. McClellan; R. L. Montgomery; B. Logsdon; C. Krueger; H. Tuscher; A. Saull; J. Miller; F. Goddard.

New Products: Combination turning, automatic cross facing and center generating tool. This is an actuating tool that hollow mills two diameters and cross faces a shoulder and at the same time generates a 60° included center in the end of track rollers. The cutting elements used in this tool are standard ¾ triangular carbide inserts, securely clamped with a single setscrew. This design reduces setup time in maintenance to a minimum. Carbide inserts need to be ground on the end only to resharpen, and except for cleaning the internal mechanism, the head need



Encircle No. 345 on Card, Opposite Page 65





SUPREME *Series-20*

BRAND

BALL BEARING CHUCKS

True "tool-room quality" . . . that's the way to describe the new Supreme "Series 20" Ball Bearing Chucks. Wherever they are used . . . on drill presses, lathes, or for special jobs, they will do their work better than any similar tool in the world. Here's why:—

SMOOTH, EASY OPERATION—effortless bit changes mean faster and easier work.

TIGHT GRIP—Eliminate all chance of damage to bit shanks.

EXTREME ACCURACY—The most precise chuck of its type ever built.

LONGER CHUCK LIFE—Finest steels hardened by exclusive processes assure long, trouble-free service.

Supreme "Series-20" Ball Bearing Chucks are made in two sizes:

Model 23T3—Capacity 0-½"

Model 24T3—Capacity ⅛"-⅝"

Supreme now makes a *complete* line . . . and a *quality* line in every way. Order from your distributor.



Supreme Chucks

up front on America's finest power tools

SUPREME PRODUCTS, INC., 2222 S. CALUMET, CHICAGO 16

never be removed from the machine spindle.

Other Products: Complete line of standard and special cutting tools and tool holders, including interchangeable counterbores and countersinks, spade drills and core drills, deep hole drills, pack bit boring bars, drill heads—plain and guided, oil inductors, block type boring tools, E-Con-O-Mills, Chip-Hog heavy duty turning tools with carbide inserts, Hy-Pressure blade locks.

GAMMONS HOAGLUND CO., THE
Manchester, Conn.
Booth No. 907

Personnel: Mrs. M. B. Gammons, pres.; C. Arthur Hoaglund, secy.; C. W. Keeney, gen. mgr.; M. A. Fitch, sales.

Products: Helical reamers.

THE GARLOCK PACKING CO.
Palmyra, N.Y.
Booth No. 560

GENERAL BOX CO.
Des Plaines, Ill.
Booth No. 1600

Personnel: R. A. Ornberg

GENERAL INDUSTRIAL DIAMOND CO., INC.
New York, N. Y.
Booth No. 810

Personnel: Edw. O. Schwarz; Mrs. A. C.

The S-22 MICROFINISH COMPARATOR



GAGE SURFACE FINISH TO NEW A.S.A. STANDARDS - *Quickly - Accurately*

This convenient pocket comparator has 22 precision surfaces for specifying and controlling finish to the new A.S.A. Standard B46.1 - 1955. Electroformed in durable corrosion-resistant nickel, the S-22 Comparator provides every department with the most inexpensive method for uniform, accurate control of finish characteristics.

Save valuable time in engineering, inspection, quality control—eliminate costly overfinishing in purchasing and production. $15.00 complete with leather case.

Available from leading industrial distributors, or write

BAPTIST MACHINE CO.
38 Ludlow Street, Stamford, Conn.

Encircle No. 347 on Card, Opposite Page 65





Catalog OB-54 gives Verson O.B.I. specifications and design details. Write for your copy.

Economy, convenience and versatility—these are the reasons for the expanding use of Verson Open Back Inclinable Presses, even on big capacity jobs like the one illustrated.

In Verson O.B.I.'s you get design and construction features normally associated with large, costly specialized machines . . . and you get the liberal slide and bed area, stroke length and depth of throat that assures their adaptability to jobs well beyond ordinary ideas of the O.B.I.'s limits.

Verson O.B.I.'s are available in capacities ranging from 90 to 250 tons in standard and special types. Let us go over your requirements with you and show you how Verson O.B.I. Presses can help you to lower costs.

A Verson Press for every job from 60 tons up.

-Verson-

ORIGINATORS AND PIONEERS OF ALLSTEEL STAMPING PRESS CONSTRUCTION

VERSON ALLSTEEL PRESS CO.

9303 S. Kenwood Avenue, Chicago 19, Illinois
So. Lamar at Ledbetter Drive, Dallas, Texas

MECHANICAL AND HYDRAULIC PRESSES AND PRESS BRAKES • TRANSMAT PRESSES
TOOLING • DIE CUSHIONS • VERSON-WHEELON HYDRAULIC PRESSES

Encircle No. 348 on Card, Opposite Page 65

Tennyson; Arthur H. Struck.
New Products: Cutting tool combining both single point and cluster type tool into one. Operator can use the cluster for roughing, especially on large grinding wheels, and then use the single point tool for finishing off. This results in longer life for the single point tool. The operator does not have to take the diamond tool out of the tool post to use one or the other.
Other Products: Wheel dressing diamond tools; coned point diamond tools for radius dressing; chisel edge diamond tools for radius dressing; centerlaps; core drills; twist drills; diamond wheels, resinoid, metal; diamond blades for cutting Germanium, silicon, etc.; diamond powder; loose industrial diamonds.

GENERAL PURPOSE CONTROLS
GENERAL ELECTRIC COMPANY
Bloomfield, Ill.
Booth No. 1440

GEROTOR MAY CORP.
Baltimore, Md.
Booth No. 750

New Products: Variable speed hydraulic transmission. Delivers high torque at low speeds. Provides infinitely variable speed drive, from full forward through zero to full reverse speed, without reversing the electric motor.

SYNTRON
Vibrating
LAPPING
POLISHING
MACHINES



- Automatic, high-speed lapping and polishing of parts, samples, etc.
- Produce perfect metallographic finishes in one-third the time.
- Eliminate use of expensive polishing wheels—practically no rejects.

New Syntron Lapping-Polishing Machines are completely automatic. Driven by variable controlled electromagnets, they assure a positive, even polishing action on practically any part or sample where microscopic finishes are required. No expensive installation or grinding equipment required.

Write for Catalog Data—

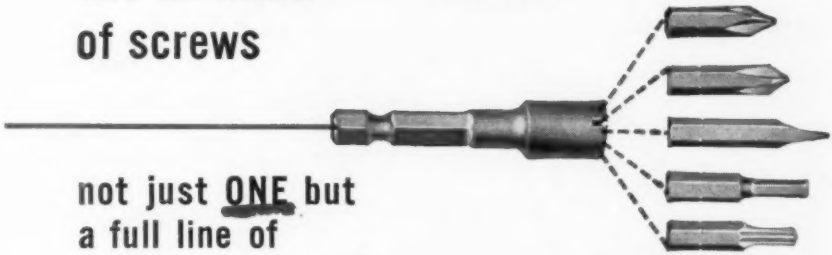
Write for FREE Catalogue Data
SYNTRON COMPANY
300 Lexington Ave. Homer City, Pa.

Encircle No. 349 on Card, Opposite Page 65

Only APEX has all the tools for every fastener need..!

You can drive not just one but five types and all sizes of screws





not just ONE but a full line of screwdriving tools

Select the type, size and make of screws best fitted to your fastening requirements . . . choose the method of operation that meets your particular needs . . . then ask Apex for the screwdriving tools to help get the job done faster, better, more economically.

Write, on your company letterhead please, for Catalog 21 (Standard Screwdriving Tools); Catalog 25 (Magnetic Screwdriving and Nut Running Tools) Catalog 29-R (Standard Nut Running Tools).

BIT HOLDERS and INSERT BITS

Originated and pioneered by Apex. Holders have exclusive, patented retaining lock ring to prevent bit from pulling out during driving operation.

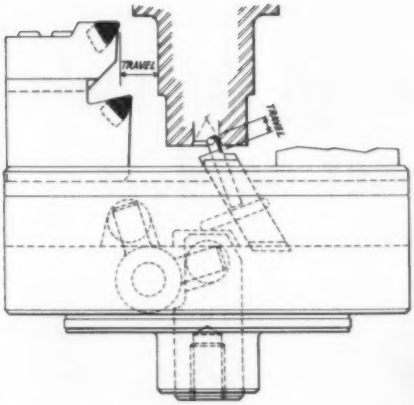
plus

POWER BITS, COMBINATION HAND DRIVERS, HAND BRACE BIT HOLDERS, FEMALE SQUARE DRIVE BIT HOLDERS . . . HAND DRIVERS, HAND BRACE BITS, FEMALE SQUARE DRIVE BITS (Phillips, Frearson, Clutch Head) . . . OFFSET DRIVERS (Phillips, Frearson) . . . FINDER SLEEVE ASSEMBLIES (Slotted).

Ask **APEX** *for the answer to your fastening problem!*

THE APEX MACHINE & TOOL COMPANY
1028 S. Patterson Blvd. • Dayton 2, Ohio

Encircle No. 350 on Card, Opposite Page 65



Drawing of Gairing combination turning, cross facing and center generating tool.
(See page 228.)

GIANT GRIP MFG. COMPANY
Oshkosh, Wis.
Booth No. 203

GIUSTINA & C.S. p.A.
Torino, Italy
Booth No. 716

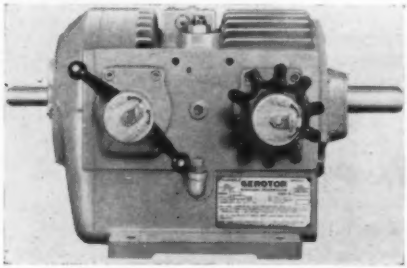
THE GOVRO-NELSON COMPANY
Detroit, Mich.
Booth No. 1226

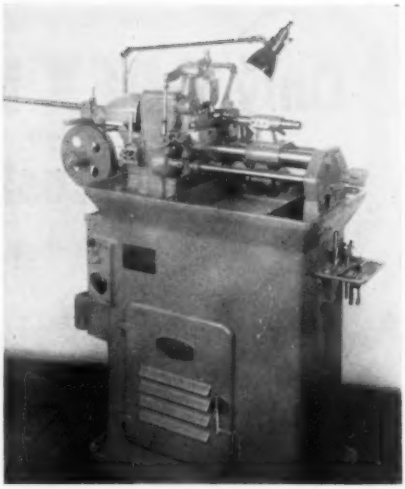
GRAY EQUIPMENT MFG. CO.
Detroit, Mich.
Booth No. 1225

GRAYMILLS CORP.
Chicago, Ill.
Booth No. 360

Personnel: W. R. Tobey; Fred Cox; O. E. Marthinson; Fred G. Littlejohn; Wendell J. Brown; H. R. Hartley; R. L. McCollom; J. P. O'Connor; Raymond Hollis; Earl E. Scheibe; E. N. Roels.
New Products: Line of ⅛ to ¾ centrifugal coolant pumps; complete coolant systems; cold solvent parts cleaning machine.

Gerotor hydraulic transmission.
(See page 232.)





Traub automatic. Guthery Machine Tool Corp.
(See page 236.)

GREIST MFG. CO.
New Haven. Conn.
Booth No. 1721

Personnel: P. Phelps

F. T. GRISWOLD MFG. CO.
Wayne, Pa.
Booth No. 236

GROBET FILE CO. OF AMERICA, INC.
Carlstadt, N.J.
Booth No. 657

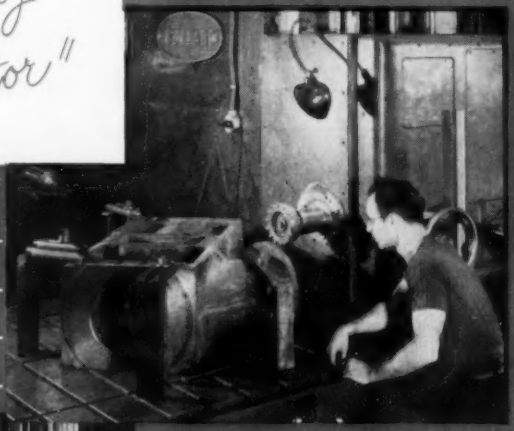
Personnel: J. M. Robert, pres.; T. J. Quinn, gen. sales mgr.; R. P. Galli, treas.;

Hanna speed control valve (See page 238.)

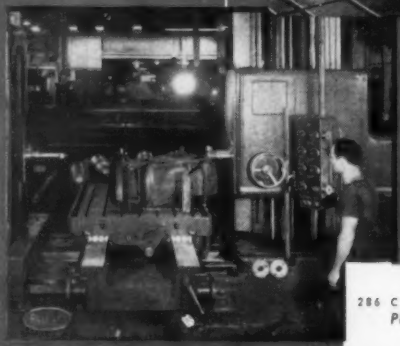


". . . the BULLARD pendant control . . . is sure handy for the operator"

Says boring mill operator at Fuller Company, Manheim, Pennsylvania, manufacturers of conveying equipment, coolers, compressors and vacuum pumps. Also, he says, "there are no levers to mess around with. On the Bullard H.B.M., Model 75, I can mill on a 45° angle in any quadrant instead of having to jockey in one direction, then in the other — like I had to do on the old machine."



the machine is outstanding for ease of operation



For full information on all the cost saving advantages offered by the Bullard Horizontal Boring, Milling and Drilling Machine, Model 75, including screw and rack feed, wide speed ranges, extra rigidity in Bed, Head, Head Post and Rear Post, optical measuring equipment (optional) and Automatic Positioning for head and table (optional),

CALL YOUR NEAREST BULLARD SALES OFFICE OR DISTRIBUTOR OR MAIL COUPON TO

THE BULLARD COMPANY
286 CANFIELD AVENUE—BRIDGEPORT 2, CONNECTICUT
Please send me a copy of the NEW H.B.M., MODEL 75 CATALOG . . .

NAME_____

COMPANY_____ POSITION_____

ADDRESS_____

CITY_____ ZONE____ STATE_____

Encircle No. 351 on Card, Opposite Page 65

N. Graham, vice-pres.; D. McKay, Detroit mgr.
Products: Swiss and American pattern files; chisel cut and ground-from-the-solid high speed steel rotary files; tungsten carbide rotary files; chatterless countersink; inside and outside tube deburring files.

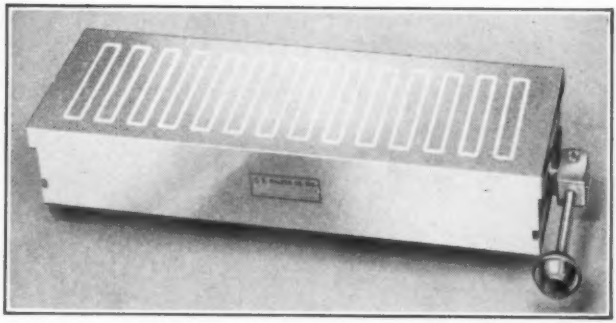
GUTHERY MACHINE TOOL CORP.
Long Island City, N.Y.
Booth No. 420
Personnel: F. Guthery, pres.; F. Furth, vice-pres.; P. Flesch, sales mgr.; M. Osborn, mgr.; Aro Div.; R. Parks, sales; L. Johnson, service.
New Products: Traub A42 single spindle automatic, 1⅝" capacity; 1" capacity single spindle automatic; 19/32" Swiss type Traub automatic; air - hydraulic operated portable spotwelder, Aro Model P-413.
Other Products: Traub single spindle automatics, Models A15, A15L, A25; Aro portable spotwelders.

H & H RESEARCH COMPANY
Trenton, Mich.
Booth No. 402

HAMMOND MACHINERY BUILDERS
Kalamazoo, Mich.
Booth No. 675
Personnel: S. H. Miller; W. J. Fabish; D. A. Kilb; W. C. Johnson; R. P. Ellis.
New Products: Electrolytic chip breaker

Walker Chucks

You May As Well Have the Best



Pioneer in the making of magnetic chucks, Walker engineers have the know-how to produce chucks that have the proud distinction of being the best in the world.

Walker Permanent Rectangular Chucks are made in nine standard sizes from 4" x 8" to 12" x 24" and larger for special applications.

Walker Rotary Chucks are made in nine sizes from 4" to 16" standard diameter and larger sizes such as 48" diameter, the largest in the world.

Swiveling Chucks are made in three sizes from 4" x 8" to 8" x 24".

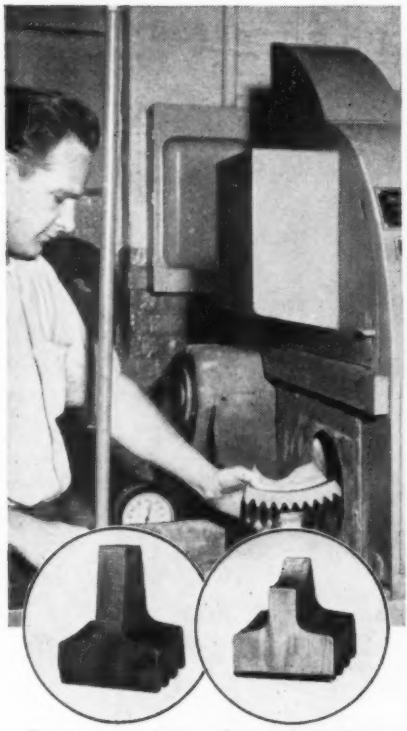
O. S. WALKER CO. Inc.
WORCESTER 6, MASSACHUSETTS
Original Designers and Builders of Magnetic Chucks

Encircle No. 352 on Card, Opposite Page 65

Abrasive Cutting

the best way to cut many materials
the only way to cut some

Campbell Cut-Off Machines



Rough, serrated cut of metal saw

Smooth-finished cut of CAMPBELL Abrasive Cut-Off Machine with ALLISON Wheel

Smooth cutting saves grinding operation for American Gear & Mfg Co.

Cross sections of gear teeth—smooth, fine-finished and ready for metallurgical study—save an entire extra grinding operation at the Lemont, Illinois plant of American Gear & Mfg. Co., a division of Brad Foote Gear Company.

These test samples are neatly "sliced" down to a single gear tooth in thickness on a CAMPBELL 406 Oscillating Wet Abrasive Cut-Off Machine, equipped with just the right ALLISON Abrasive Wheel for the job. These sections with fine finish, no hard spots, no change in metallurgical characteristics, come from the WET cut with abundant coolant applied just where it does the most good. It's the OSCILLATION of the abrasive wheel . . . the right one for the job . . . that handles big cuts like this with speed and economy.

• • •

What is your metal cutting problem? Does it involve cutting of alloy or high carbon steel? Our Field Engineers, abrasive cutting specialists, can help you arrive at that particular combination of CAMPBELL Cut-Off Machines and ALLISON Cutting Wheels that will improve your operation and save you money.

ACCO

TRADE MARK

Campbell Machine Division
AMERICAN CHAIN & CABLE

937 Connecticut Avenue, Bridgeport 2, Connecticut

Let us send you this book



Encircle No. 353 on Card, Opposite Page 65

grinder; electrolytic carbide tool grinder; mist collector; drill and tap grinder.
Other Products: Dust collector; carbide tool grinder; abrasive belt grinder.

HANDY & HARMAN
New York, N.Y.
Booth No. 275
Products: Easy-Flo and Sil-Fos silver brazing alloys; Handy Flux. A high production silver alloy brazing job, transplanted from a customer's shop, will provide an active demonstration. A collection of samples from other applications will be displayed.

HANNA ENGINEERING WORKS
Chicago, Ill.
Booth No. 366
Personnel: J. T. Ellis; J. C. Hanna; H. C. Hallerstrom; A. F. Jensen; W. B. Kuhnke; D. L. Shanks; E. R. Vogeney.
Products: Flo-Set line of speed control valves; universal mounting brackets; universal trunnion. These valves are used for controlling speeds of air and hydraulic cylinders and for regulating the flow of fluids. The valves permit forward stroke speeds to be adjusted independently of reverse cylinder strokes. Aluminum and stainless steel combine to give the valve light weight



VISIT OUR BOOTH 1300, A.S.T.E. TOOL SHOW, CHICAGO, ILL.

Encircle No. 354 on Card, Opposite Page 65

and durability. Valve is rated for 250 psi air and hydraulic service. One revolution of the valve body controls flow from zero to full opening.

HANNIFIN CORPORATION
Des Plaines, Ill.
Booth No. 158

HANSFORD MFG. CORP.
Rochester, N.Y.
Booth No. 1232

Personnel: V. N. Hansford, pres.; J. G. Schalk, vice-pres.; W. Stotz, project eng.
New Products: Model 1016 die handler for use in separating punch press dies. The die can be positioned in the die handler for work thereon. It is a safety precaution to both expensive die and the toolmaker who is working on it.
Other Products: Model 1 1015 die handler.

HANSON-WHITNEY CO., DIV. WHITNEY CHAIN CO.
Hartford, Conn.
Booth No. 163

New Products: Concentricity attachments, which have been developed for use with the H-W external and internal thread comparators. Make possible the fast, accurate, visual gaging of the thread diameter in relation to the face, outside diameters, bevels, etc., of the workpiece. This is achieved by the ro-



Aget offers more! Over 38 standard Dustkop models to choose from . . . *Plus* engineering service to help you select, provide, and install the proper accessories and fittings to complete your dust collecting system. Write for illustrated folder . . . Today!

AGET MANUFACTURING COMPANY
1402 E. CHURCH STREET • ADRIAN, MICHIGAN

Encircle No. 355 on Card, Opposite Page 65

tation or contact of the work against the concentricity attachment, causing dial indicators to show the concentricity or amount of error between the p.d. of the thread and related surfaces. Separate checking of the work is eliminated. **Other Products:** Complete line of "finished-after-hardening" cutting tools and gages for precision threading.

HARCO ENGINEERING
Detroit, Mich.

Booth No. 756

Personnel: Harold R. Steintrager; Harold F. Steintrager; Leonard Valente; M. C. Crawford; J. Calvert Steere; M. Ellision; Geo. A. Rieke; Arnold Luhm; G. Hatfield; Walter Alexander; W. J. Whatley; Fred Martin Jr.

HARDINGE BROTHERS, INC.
Elmira, N.Y.

Booth No. 452

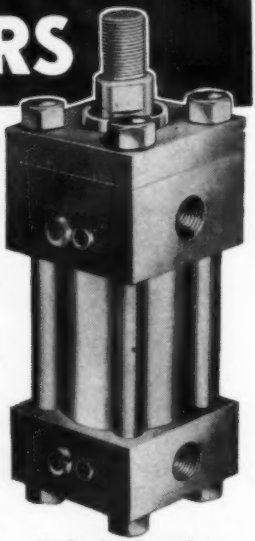
Personnel: D. R. Laux, vice-pres.; H. A. Lundy, sales mgr.; W. C. Haskins, service mgr.; E. A. Iverson, Chicago rep.; E. Allen Iverson, L. L. Hall, A. J. Turner, Chicago sales eng.; J. D. Livens, Philadelphia rep.; P. E. Chatelain, Dayton rep.; C. P. Boland, Detroit branch mgr.; R. C. Knox, J. R. Sekella, service eng.

Products: Tool room lathes, milling machine; second operation machine; chuck-

over 8,000 Different Selections For Immediate Delivery!

Miller - Quality-Famous, Heavy Duty AIR AND HYDRAULIC

CYLINDERS



now "in stock" for immediate shipment to you in popular sizes, mountings

Eliminate costly production delays —speed-up your design and replacement programs — with this greatest quality selection ever offered on such fast delivery service.

AIR CYLINDERS, 200 psi, 1½" through 8" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

HYDRAULIC CYLINDERS, 2000 psi, 1½" through 5" bores, strokes up through 36", over 15 popular mountings, cushioned and non-cushioned.

Larger bores (up through 20" air, 12" hydraulic) and longer strokes (up to 22 feet) available on longer delivery.

Write for Complete Data and Prices

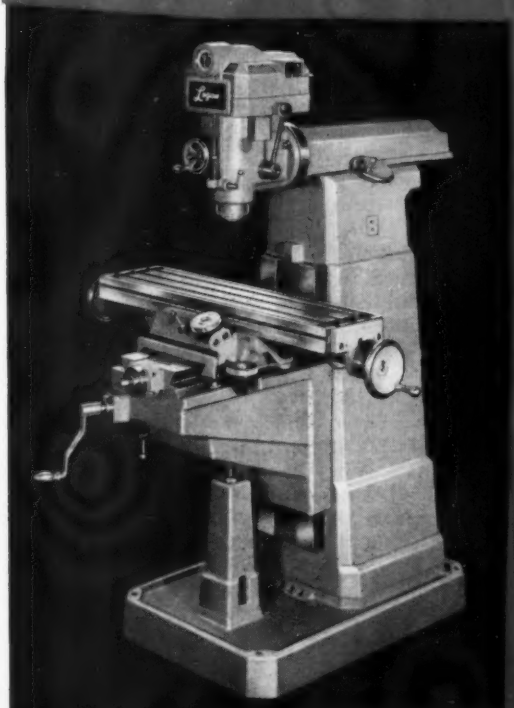
Miller

MILLER FLUID POWER COMPANY
(Formerly Miller Motor Co.)
2026 N. Hawthorne Ave., Melrose Park, Ill.
CYLINDERS • BOOSTERS • ACCUMULATORS
Sales and Service—From Coast To Coast

Encircle No. 356 on Card, Opposite Page 65

THE Logan MILL

is more than NEW...
it's years ahead!



Your Logan Dealer invites your inspection of a really new idea in Vertical Milling Machines. The most up-to-date principles of machine tool engineering are incorporated in the Logan Mill's advanced design and rugged construction. The motor in the base, for example, eliminates transmission of shock to the spindle. The large, heavily constructed ram provides 16" of clamping surface. The Variable Speed Drive offers infinite speed range of 80 to 570 rpm in low gear, and, by movement of a lever, a high gear range of 570 to 3800 rpm. The heavy, precision ground quill has a 5" travel, and the spindle revolves on precision ground, pre-loaded ball bearings. The operator has instant selection of the proper feed and speed with *no belt changes.* All these features and advantages can be purchased in the same price range as mills of similar capacity on the market.

BRIEF SPECIFICATIONS

SPINDLE SPEEDS . . . Infinite, 80 to 570 rpm in low gear, and 570 to 3800 rpm in high gear . . . infinite quill feed, 0 to .008" per revolution . . . 5" stroke . . . 360° head rotation . . . TABLE, 36" x 9" . . . three 11/16" tee slots . . . DRIVE, V-belt . . . 1½ HP, 3-Phase Motor

For full details and specifications see your Logan dealer, or write for Bulletin

LOGAN ENGINEERING CO.

4701 West Lawrence Ave., Chicago 30, Ill.

Encircle No. 357 on Card, Opposite Page 65

ing machines; turning, facing and boring lathe; speed collet chucks; collet index fixtures; precision collets; universal collet stop sets.

HARIG MFG. CORP.
Chicago, Ill.
Booth No. 1718

F. WARD HARMAN ASSOCIATES
Halesite, L. I., N.Y.
Booth No. 1128

T. S. HARRISON & SONS, LTD.
New York, N.Y.
Booth No. 415

THE HARTFORD SPECIAL MACHINERY CO.
Hartford, Conn.
Booth No. 1315

R. G. HASKINS COMPANY
Chicago, Ill.
Booth No. 561

HAUSE ENGINEERING
Montpelier, Ohio
Booth No. 246

New Products: Double end machine; automatic drill press; deep hole drilling Holomatic unit. The double end machine is a standard production machine that is designed to perform special machine type operations such as drilling, tapping and other end-cutting tool oper-



JT 38—Jiffy Tool. Constant speed machine.

STOW

8 compelling reasons why *you should do business with STOW:*

1. **DEPENDABILITY**—Stow Engineers are flexible shaft specialists.
2. **EXPERIENCE**—Stow is the oldest and largest producer of flexible shafting in all sizes.
3. **COMPLETE SIZE RANGE**—From 1/8" to 1 5/8" cores—up to 1500 lb. in. for power drives or 4000 lb. in. for remote control.
4. **STANDARD** power drive shafts available.
5. **FOUR STANDARD** types of cases. Special cases can be furnished to meet your requirements.
6. **LARGE VARIETY** of standard terminal parts available.
7. **SPECIAL** terminal parts can be made to your specifications.
8. **ENGINEERING SERVICE**—Your inquiry will receive prompt and careful consideration by TOP flexible shaft engineers.



N40 Streamliner—One of a complete line of STOW flexible shaft machines. **Write today for Catalog 51.**



STOW MANUFACTURING CO.
30 Shear St., Binghamton, N.Y.

Encircle No. 358 on Card, Opposite Page 65

Zagar Gearless Drill Heads

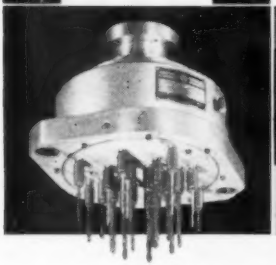
put 4 big advantages to work for you

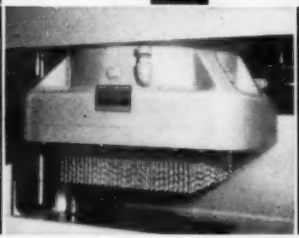

Any number of holes

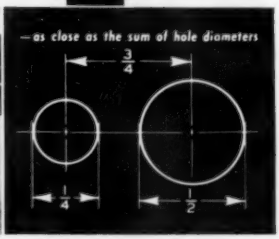

Any hole pattern


Any material


On all centers







A Zagar drill head is never obsolete. Zagar can re-locate spindles for other hole patterns.

Can you visualize the savings made possible by drilling up to 1000 holes at one pass? Zagar standard practice can handle any machinable material up to 1½" diameter. Holes of varying diameters can be drilled to form any pattern. Zagar Gearless Drill Heads, their efficiency proven by many years' success, can be installed on existing drill presses. Or, Zagar will lay out the necessary tooling for your entire job. May we see your sample parts and study your requirements? There is only one *right* answer—one *best* answer—for those requirements. May we supply it?

ZAGAR TOOL, INC. 238900 LAKELAND BLVD., CLEVELAND 23, OHIO

Zagar

We're at Booth 179, A. S. T. E. Show.

TOOLS FOR INDUSTRY and SPECIAL MACHINERY

Encircle No. 359 on Card, Opposite Page 65

ations. Incorporated are two Model 24 Holomatic drill units, a steel weldment base, and complete air and electric power and cycle control systems.

HAYNES STELLITE COMPANY, DIV. UNION CARBIDE & CARBON CORP.
New York, N.Y.
Booth No. 931

HEINRICH TOOLS INC.
Racine, Wis.
Booth No. 785

Personnel: R. C. Heinrich; Jack Gertenbach; Stanley Sheppard; Adam Knuth; G. K. Fuerst; W. E. Whitman; C. B. Teeter; Morrice Otto.
New Products: Model 22 self-centering air vise; Grip-Master band saw vise; Grip-Master safety drill vise; Grip-Master jig and fixture base. All except the Model 22 self-centering air vise feature the Circle-Grip locking mechanism that provides instant setting and positive locking. The air vise holds parts varying in size or shape when the work requires the location of a center or other pre-determined point. No. 12WH band saw vise can be set instantly by sliding movable jaw into position. It has a capacity of 12½".
Other Products: Grip-Master drill press vises and fixture locks; air vises and clamp; Camlock vise; Handnibs for shearing, nibbling, punching and rod cutting.

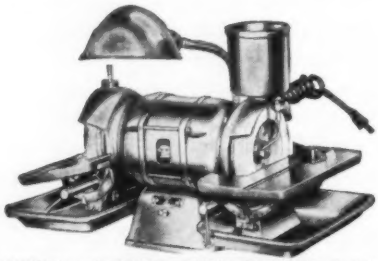
BALDOR GRINDERS

BALL BEARING - TOTALLY ENCLOSED - HEAVY DUTY



BALDOR 600 Series Grinder 1/3 h.p., 1 phase, 60 cy., 3450 rpm., 6" wheels, $54.00.

BALDOR is a basic manufacturer of grinders —even the motors (the heart of the unit) are built by Baldor. These grinders are built for heavy-duty, precision grinding in shops and factories. They are totally enclosed, protected against dust, dirt and grit. Rotors are dynamically balanced—and each grinding wheel is balanced. Ball-bearings are "sealed-for-life" type.



SPECIAL CARBIDE TOOL GRINDER built especially for sharpening carbide tools quickly and accurately. Reversible ½ h.p., motor withstands repeated overloads. $164.20.

ASK FOR BULLETIN 321-M
on complete line of Grinders and Grinder-Buffers.



Pedestals available.

BALDOR ELECTRIC COMPANY
4368 Duncan Ave. ST. LOUIS 10, MO.

Encircle No. 360 on Card, Opposite Page 65

New 6" x 18" hand feed

Thompson Grinder

FOR SHOPWORK
OR TOOL ROOM

Completely anti-friction and permanently lubricated machine. Available with all types of attachments found on tool room surface grinders including interchangeable horizontal and vertical wheel heads. A Thompson high quality precision machine at this low price.





PRECISION PETE says:

FOR LOW COST AND QUALITY YOU JUST CAN'T BEAT THOMPSON
Make your next hand feed grinder a Type D Thompson . . . write today for the new descriptive catalog, D-55



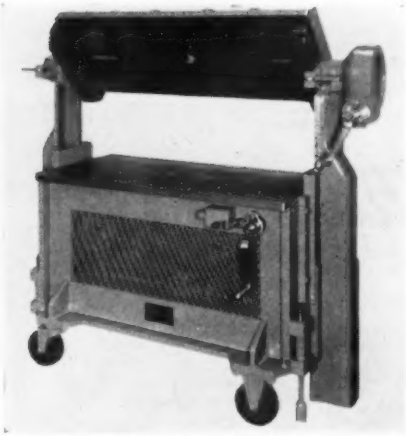
* Price F.O.B. Springfield, Ohio U.S.A., Subject to Change Without Notice.

Call, write or wire today

Thompson Grinders

The Thompson Grinder Company at Springfield, Ohio

Encircle No. 361 on Card, Opposite Page 65



Hansford Model 1015 die handler.
(See page 239.)

HEINTZ MANUFACTURING CO.
Philadelphia, Pa.
Booth No. 129

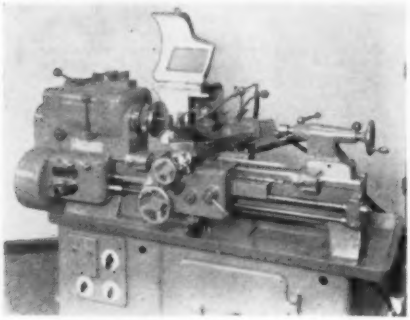
HELLER TOOL CO.
Newcomerstown, O.
Booth No. 256

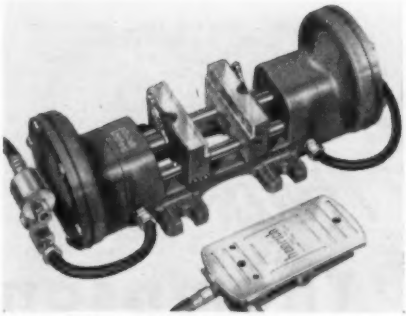
Personnel: Al Thomas; John Heller; Merritt Osborn; Jack Conrad; Ed Smith; Ralph Courchene; Walter Dawson.
New Products: Plastic file.
Other Products: Representative items from complete line.

HILLYER INSTRUMENT CO., INC.
New York, N.Y.
Booth No. 1200

CARL HIRSCHMANN CO., INC.
Manhasset, N.Y.
Booth No. 101

Harrison 11" lathe is offered by Sheppard.
(See page 242.)



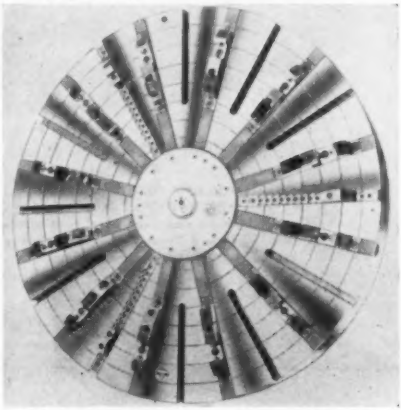


Heinrich Model 22 self-centering air vise.
(See page 244.)

HITCHCOCK PUBLISHING CO.
Wheaton, Ill.
Booth No. 282

Personnel: Robert C. Van Kampen, pres.; Vincent C. Hogren, exec. vice-pres.; Henry J. Smith, vice-pres., sales mgr.; William F. Schleicher, vice-pres., editorial director; Dan E. Reardon, James C. Stewart, vice-pres.; Victor Morris, managing editor, Machine & Tool Blue Book; Jack Kenyon, assoc. editor, Grinding & Finishing; Richard Bush, asst. editor, Grinding & Finishing; Oliver Pepper, bus. mgr.; Robert G. Bolinder, Marvin Matson, Ralph Helfrick, district mgrs.; Ralph Payne, asst. district mgr.; Robert Spreckels, circulation mgr.
Products: Monthly issues of MACHINE and TOOL BLUE BOOK, GRINDING and FINISHING, and WOOD WORKING DIGEST, as well as the annual MACHINE and TOOL DIRECTORY, will be displayed. Several technical books, including "American Built Machine Tools" and "Mechanics Through the Ages" will be available for sale.

Horton controlled centering pressure chuck.
(See page 248.)





A group of Cincinnati craftsmen, who have for years produced fine carbide tools, are now working with ultra-modern facilities in the new Staples plant. Their skill and conscientiousness can help reduce your production costs.

Please note the change of address:

THE *Staples* TOOL COMPANY

2352 Glendale—Milford Road, Evendale, Cincinnati 15, Ohio

Staples

ROTATING CUTTING TOOLS CARBIDE-TIPPED

Encircle No. 362 on Card, Opposite Page 65

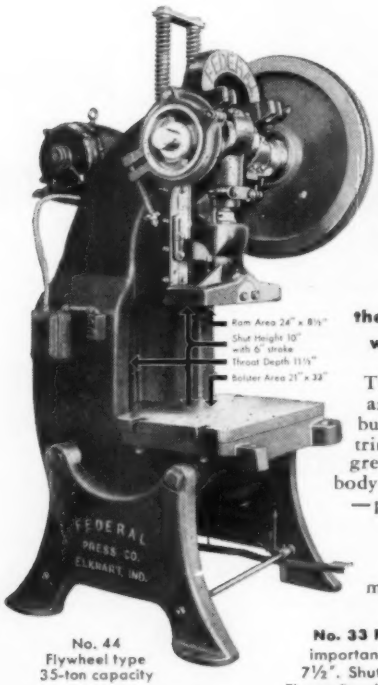
HOFMANN ENGINEERING CO.
Chicago, Ill.
Booth No. 1714
Personnel: R. E. Hofmann

HOGLUND ENGINEERING CO.
Berkley Heights, N.J.
Booth No. 205

HOLE ENGINEERING SERVICE
Detroit, Mich.
Booth No. 185
Personnel: H. C. Satterthwaite

HORTON CHUCK DIV. OF E. HORTON & SON CO.
Windsor Locks, Conn.
Booth No. 764
Personnel: G. S. Chiaramonte; D. H. Thomson; W. H. Brainerd; J. E. Thompson; A. Gasper; R. Giauque; D. B. Hunting.
New Products: Controlled centering pressure chuck for jet engine machining of thin-walled parts subject to distortion; line of Tru-Set and Windsor chucks capable of .0002 repetitive T.I.R.
Other Products: Regular line of precision chucks and boring mill jaws.

HOWE & FANT, INC.
East Norwalk, Conn.
Booth No. 575
Personnel: A. S. Howe, Jr.; R. B. Fant; Arnold Charlat; John J. Pape; John A.



No. 44
Flywheel type
35-ton capacity

For economical handling of....

BIG JOBS

You can't beat the FEDERAL #33 and #44 with "oversize" dimensions

These FEDERAL PRESSES are expressly designed for bulky jobs—such as die-cast trimming, laminations, progressive die work. Both embody the *extra quality* features—plus *quality* materials and workmanship for which FEDERALS are famous. In geared and flywheel models; air clutch optional. *Write for Catalog.*

No. 33 Press—26-ton—with following important dimensions: Ram Area: 18" x 7½". Shut Height: 9½" with 2½" stroke. Throat Depth: 8¾". Bolster Area: 16" x 32".

FEDERAL PRESS COMPANY, 610 Division Street, Elkhart, Indiana

FEDERAL PRESSES

31 Years of Quality Construction

Encircle No. 363 on Card, Opposite Page 65

RACINE®

20″ X 20″

METAL CUTTING MACHINE



EXTRA CAPACITY AT LESS COST

The Racine 20 x 20 has a two inch greater capacity at a 31 to 37% investment saving.

Rugged, simple construction with complete, modern hydraulic controls.

A single lever controls all operations.

All parts are easily accessible.

Dual 100% progressive metered Positive and flexible feed

Write for catalog and prices of complete RACINE line, including single purpose, special and fully automatic models, capacities from 6″ x 6″ to 20″ x 20″.

RACINE HYDRAULICS & MACHINERY, INC.

2054 Albert St., Racine, Wisconsin

Encircle No. 364 on Card, Opposite Page 65

Rinek; W. W. Miller; Alexander Matus; W. H. Classen.

New Products: Turret drilling and tapping machine with universal jig base for rapid, accurate work positioning.

Other Products: Turret drilling and tapping machines; turret drilling and tapping attachments.

HUDSON AUTOMATIC MACHINE & TOOL
Union City, N.J.

Booth No. 940

C. B. HUNT & SON, INC.
Salem, Ohio

Booth No. 141

HURON MACHINE PRODUCTS INC.
Dearborn, Mich.

Booth No. 1029

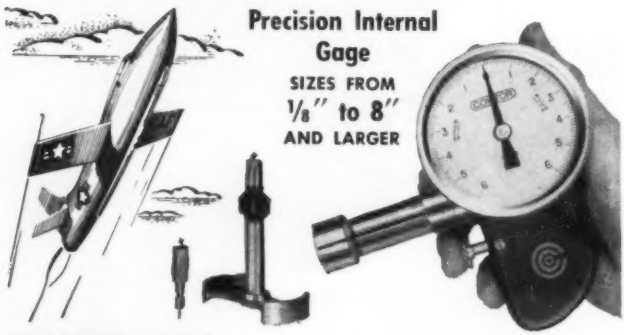
Personnel: H. E. Lindemann, pres.; Mrs. Iva Lindemann, secy.-treas.; Franklyn K. Carney, sales mgr.; R. H. Herms, East Coast office; George Gartelman, West Coast office; Richard Collins, plant supt.

New Products: New and enlarged line of Taperlock plug gage blanks. All lengths are stocked in approximate 1/16" graduated steps from No. 000 to No. 5 sizes, hardened to 62-64 Rockwell.

Other Products: Taperlock gage handles;

Did you know that---

The Jet Engine Program relies heavily upon this gage for critical bores.



COMTORPLUG: with interchangeable expanding plugs to gage simple or special bores from 1/8" to 8" dia.

UNIQUE ADVANTAGES

Positive gaging accuracy to fraction of .0001" regardless of who operates it.
Indicates actual size, a fixed—not passing—reading.
Positive 2-point gaging — automatic centering.
Shallow holes, deep holes, inside splines, open-end holes gaged easily.
Detects ovality, back or front taper, bell mouth, barrel shape.
Reaches to bottom of blind holes.
Gages work while still held in chuck.
A shop tool for all-day every day use.
Portable — no wires, hoses or stands.

Investigate the gage used by the thousands in jet engine, guided missile, farm machinery, automotive transmission, household appliance, and other volume-precision plants. IT MAKES PRECISION GAGING EASY . . . at machine . . . at inspection bench . . . for selective assembly. No other like it — investigate and see why.

COMTOR CO.
62 Farwell St.
Waltham 54,
Massachusetts



GET THE FULL FACTS — REQUEST BULLETIN 48

Encircle No. 365 on Card, Opposite Page 65

reversible gage handles, bushings and blanks; Trilock gage handles and blanks; plain ring gage blanks; thread ring gage blanks and locking assemblies; thread ring holders; master setting disc blanks and grips; ball handles; Tru-cut compound.

HYDRO-LINE MFG. CO.
Rockford, Ill.

Booth No. 321

Personnel: O. B. Harding, pres.; J. L. Modrich, vice-pres.; John Harding, secy.; Mark Tull, sales eng.; Joe Bose, chief eng.; Roger Schumacher, sales eng.; Stuart Taylor, prod. mgr.

New Products: Series J high pressure hydraulic cylinders; Series N hydraulic cylinders; Series S automation heavy duty air cylinders.

IDEAL INDUSTRIES, INC.
Sycamore, Ill.

Booth No. 659

Personnel: J. M. Elliott; D. A. Sundstedt; F. C. Binkley; O. W. Rosengren; W. G. Schinske; L. E. Peterson; E. W. Harfst.

New Products: Resistance soldering tools.

Other Products: Live center; etchers; demagnetizers; tachometer.

ILLINOIS METAL PROD.
Chicago, Ill.

Booth No. 1712

Personnel: Edward G. Rix



Encircle No. 366 on Card, Opposite Page 65

INDEX MACHINE CO.
Jackson, Mich.

Booth No. 791

Personnel: G. S. Adams; H. T. Andress; E. G. Lohman; Al Marsh.

New Products: High speed vertical milling machine.

Other Products: Index plain horizontal milling machine; index precision rotary tables; accessories and attachments for milling machines.

INDUSTRIAL DIAMOND ASSOCIATION OF AMERICA
Pompton Plains, N.J.

Booth No. 520

INDUSTRIAL FILTRATION CO.
Lebanon, Ind.

Booth No. 567

Personnel: N. B. Wagner

INDUSTRIAL TECTONICS, INC.
Ann Arbor, Mich.

Booth No. 1100

Personnel: H. F. Stern, gen. mgr.; K. W. McKenzie, sales mgr.; R. W. Niles, chief eng.; C. M. Adams, sales eng.

New Products: Tooling ball sets—balls attached to shanks made to a high degree of concentricity for tooling and fixture work, made of 440-C stainless steel; special ball or roller bearings that

Now!
PRECISION EXPANDING MANDRELS
by CHAMPION



The expanding sleeve, mounted on tapered arbor, expands automatically to fit the hole. Inserted by hand — no arbor press needed. Always an exact, positive, concentric fit. Locked by a single mallet blow. Unlocked in the same way. CHAMPION Expanding Mandrels are used in machine shops around the world. Save time, cut production costs, whether the job calls for machining one piece or a thousand.

Precision Model has expansion range of .010". Available in regular sizes to fit holes from ½" to 9½" diam. Holds work to tolerances of .0002" run-out. Guaranteed for precision grinding, turning and milling operations.

Standard Model maintains close tolerances, handles material of any length bore, hard or soft metals — from thin tubes and bushings to heavy castings and forgings. A set of fourteen will fit every hole from ½" to 9½" diameter.

CHAMPION Expanding Mandrels can be made in special shapes and sizes to fit any specifications. Quotations on request. Write for descriptive folder today.

Manufactured by WESTERN TOOL & MFG. CO., INC. • *Sales Agents*

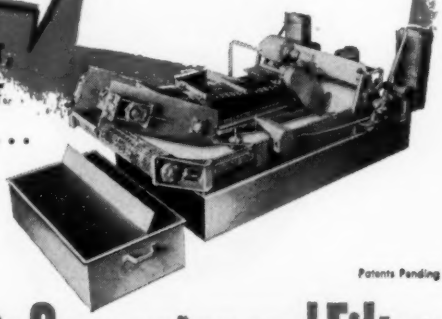
PATTON
MANUFACTURING COMPANY, INC.
1802 West Pleasant St., Springfield, Ohio

Encircle No. 367 on Card, Opposite Page 65

Are You Looking For This?

- New method of gravity flow and magnetic attraction.
- Smaller filter . . . greater flow capacity.
- Greatly increased magnetic attraction.
- 25-50% less floor space required.
- More complete filtration.
- Greater swarf load capacity.
- Reduced operating costs.
- Out-performs all present units.

Announcing the NEWEST, MOST EFFICIENT, MOST POWERFUL MAGNETIC . . .



Delpark's Combined Magnetic Separator and Filter

Patents Pending

CONTINUOUS, FULL FLOW, SELF-CLEANING, FULLY AUTOMATIC FOR THE REMOVAL OF FERROUS SLUDGE AND ABRASIVES FROM COOLANTS

Delpark

FIRST in Filtration Advancements

BACKED BY MORE THAN 40 YEARS EXPERIENCE IN INDUSTRIAL FILTRATION

UNEQUALLED IN EFFICIENCY . . . gives filtration performance never before possible on production work. The only separator using gravity flow of liquids *on top* of the greatest magnetic power giving benefit of both gravity and magnetic separation. Reduced filter size . . . **25 to 50% LESS FLOOR SPACE REQUIRED.**

Write for more detailed information.

INDUSTRIAL FILTRATION COMPANY 22 Industrial Avenue LEBANON, INDIANA

Encircle No. 368 on Card, Opposite Page 65

are not AFBMA standards; ballizing operation — hydraulic press with specially designed ball recirculation fixture to show the production sizing of internal diameters; ballizing sets—sets of precision carbide balls in special over sizes to produce nominal size holes from ⅛" to 1" dia.

Other Products: Super precision master ball sets; modified balls; balls of all materials, hollow or solid; precision concave and convex spherical surfaces.

INGERSOLL-RAND CO.
New York, N.Y.

Booth No. 345

New Products: Exhibited will be the new Torsion Bar torque control Impactools; a completely automatic multiple nut runner; and a selected group of new air tools.

Other Products: 100 hp PHE air compressor that will furnish a supply of 100 psi air.

INSPECTION DEVICES COMPANY
Chicago, Ill.

Booth No. 1231

INTERNATIONAL RESEARCH & DEVELOPMENT CORP.
Columbus, Ohio

Booth No. 1026

JARVIS CORPORATION
Middletown, Conn.

Booth No. 1401

FREE MANUAL

tells why

DY-NAMIC BALANCING

should be a regular part of EVERY **MAINTENANCE OPERATION**

24 PAGES OF VALUABLE INFORMATION LIKE THIS:

- How To Balance Parts From 4 Oz. to 8 Tons!
- What is Dy-Namic Un-balance?
- The Difference Between Static and Dy-Namic Un-balance!
- How To Balance Rotating Parts Statically and Dy-Namically In One Operation!
- How Other Plants Are Using Dy-Namic Balancing To Save Time and Money!
- How Dy-Namic Balancing Improves Product Performance!
- How Dy-Namic Balancing Reduces Wear, Eliminates Noise And Vibration.
- Details, Specifications And Engineering Data About Complete Line of "Bear" Industrial Dy-Namic Balancing Machines.

This newest-edition Dy-Namic Balancing Manual contains information on latest technological advancements to improve maintenance work.

Shows how to improve performance of overhauled or repaired machinery and parts, by eliminating mechanical failures and assuring greater efficiency.

Explains how Dy-Namic Balancing keeps equipment operating without interruption. See how periodic checking and Dy-Namic Balancing of rotating parts will reduce bearing wear and noise, as well as eliminate costly downtime for repairs.

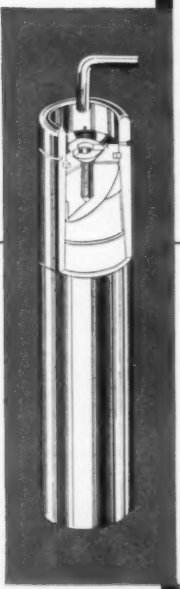
For your free copy, write: Bear Mfg. Co., Dept. M-20 Rock Island, Illinois.

782R



"BEAR"
STATIC AND *DY-NAMIC BALANCING* MACHINES

Encircle No. 369 on Card, Opposite Page 65



One Man Removes Large Punch Holder in 3 Minutes!

with SUPERIOR

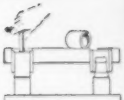
REMOVABLE CAP GUIDE PINS

End Troublesome Binding in Die Set Assembly

Superior's Removable Cap Guide Pins eliminate punch holder binding on guide posts when parting dies. The cap is removed from the pin merely by loosening a socket head screw which holds the cap in place. This frees the punch holder at the most critical point of the pin where it is apt to cock or bind. Instead of needing 2 or 3 die makers to remove the punch holder from a set, one man can easily do this work alone in a few minutes.

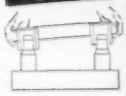
NOW OFFERED IN PIN DIAMETERS OF 1¼" UPWARD, AS STANDARD EQUIPMENT ON ALL SUPERIOR DIE SETS. SPECIFY IF DESIRED. WRITE FOR COMPLETE FREE INFORMATION.

FAST



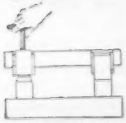
REMOVING CAP

SAFE



PARTING DIE SET

ACCURATE



REPLACING PUNCH HOLDER



See it demonstrated at Booth No. 338, ASTE Exposition

SUPERIOR STEEL PRODUCTS CORP.
2754 S. 19th ST., MILWAUKEE, WIS

Encircle No. 370 on Card, Opposite Page 65



Howe & Fant turret drilling and tapping machine.

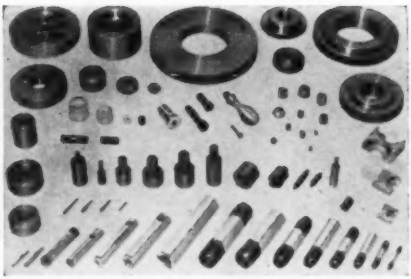
JERGENS TOOL SPECIALTY CO.
Cleveland, O.

Booth No. 401

Personnel: Christy Schron, pres.; Jack Schron, vice-pres.; Jay Capes, sales supr.

New Products: Template tracings; sine fixture key; replaceable pads on strap clamps.

Other Products: Standard parts for jigs, fixtures, dies and special machinery; chuck jaw blanks; complete casting line, hand knobs, hand wheels, etc.



Huron Machine Products.

JERPBAK BAYLESS CO.
Solon, O.

Booth No. 1031

Personnel: Carl Jerpbak; Roy Jerpbak; Roger Sheer; George Ober.

New Products: Portable lead checking comparator; length and width comparator, portable and bench type; internal



Commander SELECT A SPINDLE

DUAL SPEED DRILL PRESS TURRET

DRILLS, REAMS, TAPS ON 1 DRILL PRESS SPINDLE!

• Fits Any Drill Press • Increases Production

• Reduces machine, fixture costs

Commander Select-A-Spindle permits you to do 3 operations on a single drill press spindle . . . save time . . . eliminate multiple handling of piece parts, speed production and reduce overall costs. Dual Speed Select-A-Spindle permits selection of proper speed for each operation. Quick, positive hand indexing positions each tool accurately for sequence operations. Select-A-Spindle is built to tap with any 1, 2, or all 3 spindles to the full capacity of the unit. Adjustable torque control spindles for protection of taps to ¼" available.

Write for illustrated circular on Select-A-Spindle, other Commander Production Tools and name of your nearby Commander Distributor

Commander MFG. CO.

4227 W. KINZIE STREET, CHICAGO

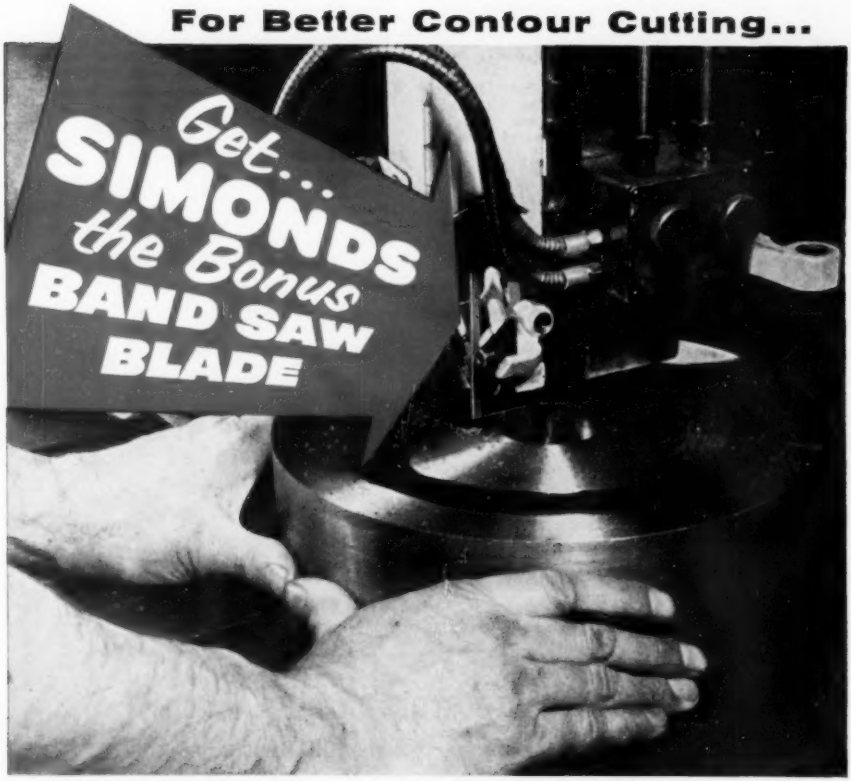
PRODUCT OF COMMANDER

BUILDER OF PRODUCTION TOOLS

See us at Booth No. 800, A.S.T.E. Show, International Amphitheatre, Chicago, March 19-23

Encircle No. 371 on Card, Opposite Page 65

For Better Contour Cutting...



gives you more cuts, longer life, lower costs!

Here's a tough, edge-holding metal cutting band saw blade that gives you a real bonus in smooth, fast cutting and long life.

Made of extra tough, wear-resistant alloy steel, Simonds "Bonus" Bands have sharp, perfectly formed teeth — set with absolute evenness on both sides of the blade. Hardened along the tooth edge only by controlled heat treatment, they combine maximum cut-ability with flexibility and resistance to breakage, provide the ultimate in trouble-free service.

All standard widths and tooth spacings are furnished in 100′ and 250′ coils or welded to specified length. Ask your local Simonds Industrial Supply Distributor for more information on the complete line of Simonds "Bonus" Band Saws.

For Fast Service from Complete Stocks



Call your **SIMONDS Industrial Supply DISTRIBUTOR**

SIMONDS SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Oregon
Canadian Factory in Montreal, Que., Simonds Divisions: Simonds Steel Mill, Lockport, N. Y.
Heller Tool Co., Newcomerstown, Ohio, Simonds Abrasive Co., Phila., Pa., and Arvida, Que., Canada

Encircle No. 372 on Card, Opposite Page 65

and external comparator, portable and bench type. Lead checking comparator permits fast, accurate inspection of screws, on or off machine. Quickly set to size of master screw.

Other Products: Wheel crusher units and rolls; taps; thread gages; thread milling cutters; worm face gear grinding wheels; misc. thread ground products.

JIFFY DISINTEGRATORS INC.
Ferndale 20, Mich.
Booth No. 200

Personnel: F. E. Bugher; D. F. Bugher; L. C. McCaskill; Roger Decker; P. D. Dougherty; Earl C. Sexouer; H. J. Sexouer; Eugene Cooper.

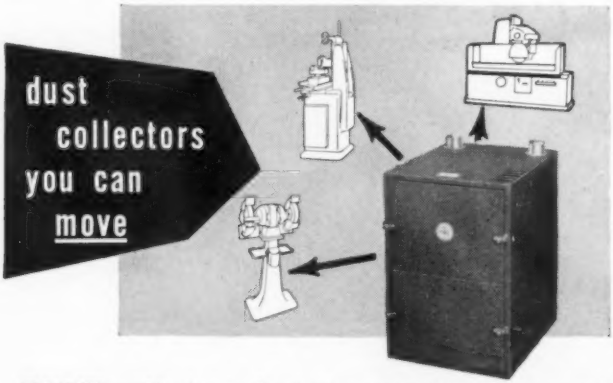
New Products: Two new types of metal disintegrators which operate without the use of electronic components.

Other Products: Combination level and angle finder, for quick setup on machines, tools, etc.

JOHANSSON GAGE CO., C. E.
Dearborn, Mich.
Booth No. 1217

Personnel: E. C. Lindman; E. D. Johansson; G. R. Peterson; Carl Olson; C. G. Gist; Ed. Mack.

New Products: Deltameter, for automa-



TORIT units trap dust at source! save money!

You can move and install Torit dust collectors yourself. We'll engineer your toughest dust problem and also check the installation. Torit units are usually more efficient and money-saving than central (built-into-the-building) systems. Torit units operate only when machines they protect are in use. Filtered air may be returned to room to save heat. Many models and sizes, all self-contained, easy to move. Write today to . . .

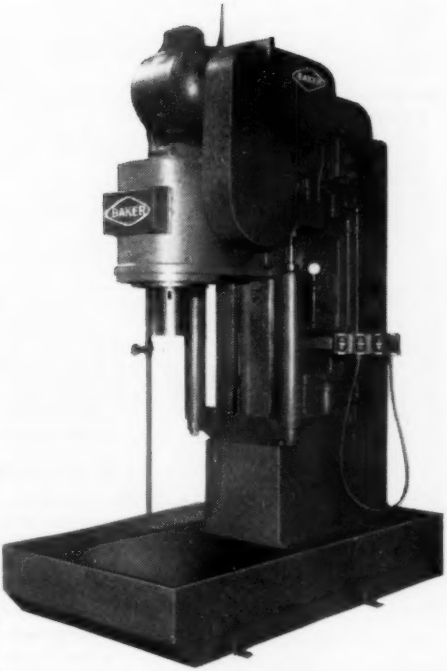
Dept. 602

TORIT MANUFACTURING CO.

303 Walnut Street, St. Paul 2, Minn.

Encircle No. 373 on Card, Opposite Page 65

WHAT! AUTOMATE WITH STANDARD MACHINES?



It's true that on low-production jobs a specially built automatic machine tool can take too long to pay for itself. But not so with Baker Basic machines. They cost much less than a machine designed for only one part. What's more, they don't have to be completely "rebuilt" when you have to change your product or production methods. They can be retooled with relative ease and at less expense. Yet you still have full labor-saving automation with loading and unloading devices and conveyors. We'll furnish this equipment as well as tooling if you wish. Use Baker Basics singly or in battery . . . for drilling, boring, facing and other machining operations. In 5 sizes.

BAKER

AUTOMATION

Best in the long run
Practical in the short run

•• Mail Coupon Today ••••

BAKER BROTHERS, INC., Dept. MT-356
Toledo, Ohio

Please send free Catalog on Baker Basic machines.

NAME AND TITLE

COMPANY

ADDRESS

CITY ZONE STATE

Encircle No. 374 on Card, Opposite Page 65

tion; 502 dial indicator; multiple interference microscope.
Other Products: Mikrokator indicators; gage blocks; micrometers; snap gages; length rods.

JOHNSON GAGE CO., THE
Personnel: S. G. Johnson, pres.; C. V. Johnson, v.p.; P. W. Johnson, v.p.; R. V. Johnson, sales eng.; J. F. Greacen, sales eng.
New Products: Pivotal plug-snap gages and comparators in hand and bench models for checking internal screw threads No. 4 and larger.
Other Products: Screw-thread gages, screw thread comparators and analyzers. Concentricity and squareness checking attachments.

JONES & LAMSON MACHINE CO.
Springfield, Vt.
Booth No. 497

JONES & LAUGHLIN
Pittsburgh, Pa.
Booth No. 1606
Personnel: R. C. Dickman

A. A. JONES & SHIPMAN LTD.
Leicester, England
Booth No. 425

N-P NATIONAL SALES
Muskegon, Mich.
Booth No. 1717
Personnel: C. C. Kaiser



Heads...You Win!

U. S. DRILL HEADS, THAT IS!



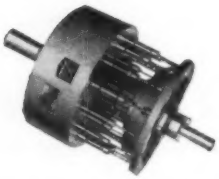
For automatic setup.

Regardless of the size of your shop, if you have high production jobs, you'll find an extraordinary reduction in tooling and manufacturing costs when you use U. S. Drill Heads.

The heads shown here, moderate in cost, are for use with automatic chucking machines and turret lathes, for drilling or tapping operations. They provide, in most cases, that a part can be completely finished in one handling.



For semi-automatic setup.



For semi-automatic setup.



Manufacturers of all types of adjustable, fixed center and individual lead screw tapping heads.

US DRILL HEAD — THE UNITED STATES DRILL HEAD COMPANY

616-618 Burns Street, Cincinnati 4, Ohio

Encircle No. 375 on Card, Opposite Page 65

LIKE A "45" AUTOMATIC



this NEW INDEX "45" MILL

has the "CALIBER" and "ACCURACY" to do your MILLING, DRILLING and BORING JOBS .. BETTER, FASTER AND MORE ECONOMICALLY!



A FULL RANGE OF OTHER MODELS.

The big caliber derives from the sliding overarm—The unique square design of this overarm gives much more rigidity with its resultant greater accuracy—It provides extra range and capacity—More usable working space—More versatility in set-up—More power at the cutter. No adjustment required on overarm and head after use, and no need to re-indicate head after moving overarm. Speed range with 9 changes makes possible the use of high speed or carbide tipped cutters to the best advantage. Many other important features. *Write for Literature.*

VISIT OUR BOOTH 791
A. S. T. E. Ind. Exp.

INDEX MACHINE CO.

540 N. MECHANIC STREET JACKSON, MICHIGAN

Encircle No. 376 on Card, Opposite Page 65

KALAMAZOO TANK AND SILO CO., MACHINE TOOL DIV.
Kalamazoo, Mich.

Booth No. 639

Personnel: E. L. Anderson, A. A. Ahlgren, H. B. Hazerodt, L. M. Halleck, J. M. Coombs, J. J. Davitt.

New Products: Automatic horizontal metal cutting bandsaw machine.

KARNIOTIS PRECISION PRODUCTS
Detroit, Mich.

Booth No. 1033

Personnel: C. Karniotis

KAYDON ENGINEERING CORP., THE
Muskegon, Mich.

Booth No. 268

Personnel: J. F. Oehlhoffen, vice-pres.; R. A. Weisse, asst. sales mgr.; R. L. Blais, sales eng.; R. G. Anderson, sales engineer.

New Products: Reali Slim bearing, ¼x¼ section up to 12" bore with ⅛ balls and separator.

Other Products: Reali Slim bearings, ball and roller; special flanged bearings.

KENCO MFG. CO.
Los Angeles 22, Calif.

Booth No. 618

New Products: Model 15, 15-ton Electro-safe punch press. Completely electrical in single stroke punching, it has interlocking switches which provide safeguards against all punching hazards.

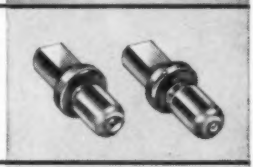
Call on CLARK

for All Your "Rockwell Testing" Needs

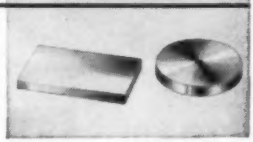
CLARK Diamond Cone Penetrators are exactly right for your "Rockwell" hardness tester, whether or not it bears the CLARK name. Every step in their manufacture, from careful diamond selection to expert lapping, leads to a precision product that will give you precision results. Yet CLARK Diamond Penetrators cost surprisingly little.



CLARK Steel Ball Penetrators, for accurate "Rockwell testing" of unhardened steel, cast iron, brass, bronze, and similar materials, are available in all standard sizes.



CLARK Test Blocks, in various hardness grades, provide a quick, sure, and simple method of checking the accuracy of your "Rockwell" type hardness tester.



Write today for descriptions and prices.

CLARK INSTRUMENT, INC.
10206 Ford Road • Dearborn, Mich., U.S.A.

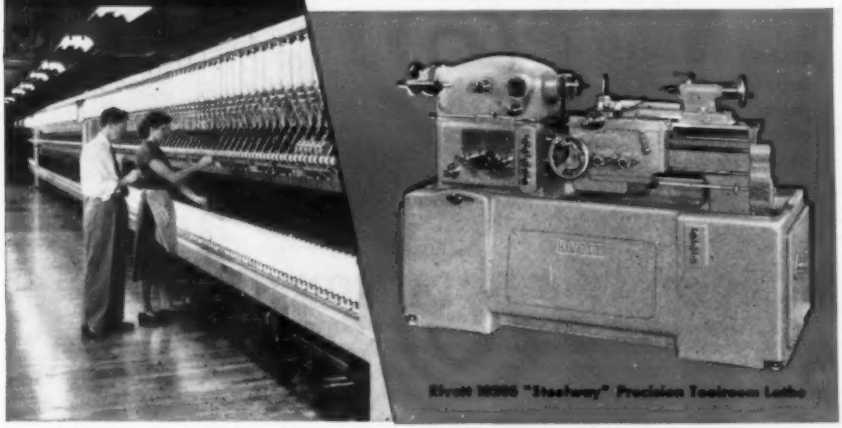
CLARK

Encircle No. 377 on Card, Opposite Page 65

2 for 1 lathe

...zooms tooling quality at world-leading builder of textile machinery!

Saco-Lowell Shops Gwaltney Spinning Frames



Rivett 1020S "Steelway" Precision Toolroom Lathe

SACO-LOWELL SHOPS
Biddeford, Me. Reports—

"The Rivett 1020S can handle heavy, rough cuts yet maintain very close tolerances on the finish. Because of its simplicity and quick action, the spindle speed selector is a great improvement over the other lathes in our toolroom. If the Rivett is not in use (which is very seldom), our toolmakers go to it first in preference to our other lathes."

FEATURES

- **40% heavier than comparable lathes.**
- **Back gearing for power cuts—belt drive for high speeds.**
- **Hardened steel ways with 12¾" spread.**
- **Infinite spindle speeds 22 to 3600 r.p.m.**
- **Push button controls for all operations.**
- **Neutral clutch stops spindle without stopping drive.**
- **Intermediate spindle bearing prevents deflection.**
- **Collets mount directly in spindle.**



RIVETT LATHE & GRINDER, Inc.
Dept. MTR 3
Brighton 35, Boston, Mass.
Send Free 16-Page Bulletin 1020B

Name_____

Company_____

City_____ State_____

RIVETT

RIVETT LATHE & GRINDER, Inc.
Brighton 35, Boston, Massachusetts

Encircle No. 378 on Card, Opposite Page 65

COLLINS

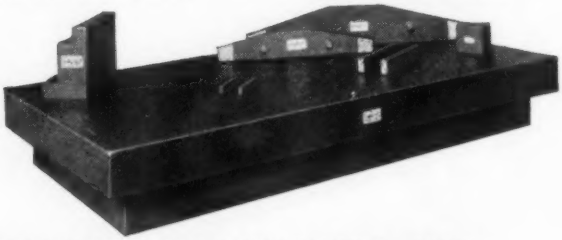
MICROFLAT®

BLACK GRANITE

- SURFACE PLATES
- ANGLE PLATES
- STRAIGHT EDGES
- LAYOUT PLATES
- PARALLELS
- T-SLOTTED PLATES

COLLINS MICROFLAT surface plates and precision accessories offer the user life-time accuracy at a minimum cost

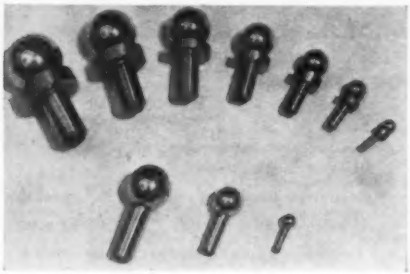
All sizes—
Write for bulletins.



COLLINS MICROFLAT COMPANY, INC.

2326 East 8th Street • Los Angeles 21, California

Encircle No. 379 on Card, Opposite Page 65



Industrial Tectonics tooling balls.
(See page 252.)

KENHOS CORP.
Norwalk, Conn.

Booth No. 1140

KENNAMETAL INC.
Latrobe, Pa.

Booth No. 475

New Products: Expanded line of Kendex tooling in 17 styles, available in over 100 tools—holders with positive and negative rake, heavy duty types; button type inserts designed for a broad range of applications. Inserts are available with all surfaces ground for precision requirements and as regular inserts with only top and bottom surfaces ground. Inserts in standard nose radii in six different grades.

KEUFFEL & ESSER COMPANY
Hoboken, N.J.

Booth No. 524

KING PUNCH CO.
Chicago, Ill.

Booth No. 712

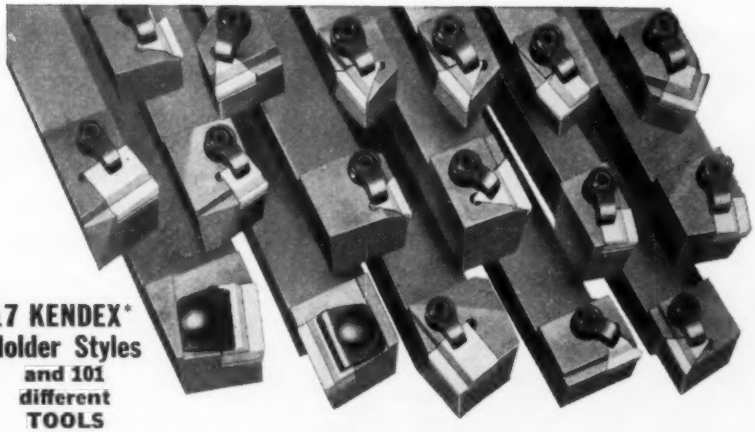
Personnel: S. J. Turk, pres.; G. J. Zanotti, vice-pres.; E. V. Fox, T. Mucha, Jack Haynes, C. Barber, salesmen.
New Products: Precision piercing punches and matching die buttons ground between centers within .0001 concentricity; precision special-shaped punches.

KOEBEL DIAMOND TOOL CO.
Detroit, Mich.

Booth No. 209

Ingersoll-Rand heavy nut running tool.
(See page 254.)





17 KENDEX* Holder Styles and 101 different TOOLS

KENNAMETAL† today offers the tooling for tomorrow

Kendex Button and Heavy Duty tools can truly be considered as the "Tooling for Tomorrow."

Kendex holders are simple and rugged in construction; fitted with trouble-free, interchangeable "hardware"; accommodate square, round and triangular turnover, throw-away button inserts that eliminate costly grinding . . . all features needed to keep tomorrow's high speed, highly synchronized production lines on the go—hour after hour.

"Tooling for Tomorrow" must face up to varied cutting jobs, on many types of machines . . . machines that will require quick, accurate tool changing for close tolerance work at high speeds and low costs per piece. Kendex tooling was designed for such conditions. In addition, it increases efficiency; lowers tool investments; sharply reduces maintenance costs. There are over 100 Kendex tools and 35 different Kendex inserts—some stocked in as many as six Kennametal grades.

Why not have a Kennametal tool engineer help you step up efficiency on today's jobs with Kendex "tooling for tomorrow." He works exclusively with Kennametal tooling . . . applying and servicing it. This specialized experience is yours for the asking. KENNAMETAL INC., Latrobe, Pennsylvania.

Eleven Kennametal Grades . . . To Give You Top Performance

No matter how versatile or rugged the toolholder—final performance depends on the cutting edge. Here's where hard, uniform, dependable Kennametal blanks and inserts will pay off on your operations—regardless of the job or machine. With eleven grades to select from, you get top performance on every cutting job.

Try Grade K21, the ideal general purpose steel cutting grade that is outperforming all other general purpose carbides, and its companion . . . Grade K5H . . . a hard crater-resistant grade for finish machining at high speeds. Kennametal's simplified grade selection system makes it easy to get the right grade on every job.

INDUSTRY AND KENNAMETAL
. . . Partners in Progress

*Registered Trademark; Patent applied for
†Registered Trademark A-9435A

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PRODUCTION TOOLS by APEX



APEX
engineered and manufactured the original adjustable, shankless, serrated tool.

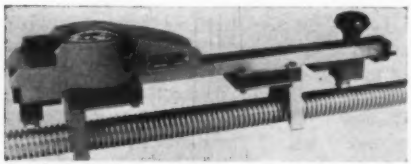
MULTIPLE MILLING CUTTER

This combination tool, with super cobalt, adjustable, serrated blades, incorporates boring and facing into a single operation See it and the full APEX line at Booth 174. Send for catalog. Service engineers will gladly co-operate with you on tooling.

A.S.T.E.
TOOL EXPOSITION
Chicago, March 19-23
Catalog on Request

THE APEX TOOL & CUTTER CO., SHELTON 14, CONN.

Encircle No. 381 on *Card*, Opposite Page 65



Jerpbak Bayless portable lead checking comparator. (See page 256.)

KOLCAST INDUSTRIES, INC.
Willoughby, O.

Booth No. 1110

Personnel: Lewis R. Schilling, pres.; Nelson G. Spoth, vice-pres.—sales; Meacham Hitchcock, Robert Kramer, William Everett, J. Patrick Kelly; sales engineers; Margaret Hutchinson.
New Products: Valve body, exhaust duct, pump scroll, cast turbine wheel, and compressor casing.
Other Products: Stainless steel and alloy steel investment castings for the aircraft, guided missile, atomic energy, chemical, corrosion and heat resistant fields.

LAMINA DIES & TOOLS, INC.
Oak Park, Mich.

Booth No. 562

Personnel: W. Tilder; J. Connor; R. Povlitz; W. Stoye; V. Gross; F. J. Henkel; H. Hunger.
Products: Guide pins and bushings.

LANDIS MACHINE CO.
Waynesboro, Pa.

Booth No. 578

Personnel: R. E. Yingling, sales mgr.; D. R. Stoner, Jr., asst. sales mgr.; G. M. Stickell, vice-pres.—gen.-mgr.; C. W. Hopkins, chief eng.; F. Nell, tap plant supt.; P. A. Reynolds, mgr. Chicago area.
New Products: Landmatic hardened and ground die heads for turret lathes with improved size adjusting mechanism; Landex hardened and ground die heads for automatic screw machines; Lanroll thread rolling attachment for the production of precision taper threads, including dry seal. Attachment was originally designed for straight thread rolling only. Through the use of proper parallel thread rolls and thread roll equipment, it can now be used for either straight or taper rolling.
Other Products: Complete line of tangential chaser die heads—Landmatic for turret lathes, Landex for automatic screw machines, Lanco for threading machines; solid adjustable die heads; collapsible taps; solid adjustable taps; Lanroll thread rolling attachments.

LAPEER MFG. CO.
Lapeer, Mich.

Booth No. 553

Personnel: J. A. Herrington, pres.; F. W. Lampe, chief eng.; C. K. Kaiser, E. E. Hightower, L. P. Wood, K. W. Stoffregen, C. P. Nankervis, sales rep.
New Products: Heavy-duty clamps,



With Permanent Magnetic Chuck

NEW *Vulcan*

MOTORIZED ROTARY TABLE

for lapping and grinding

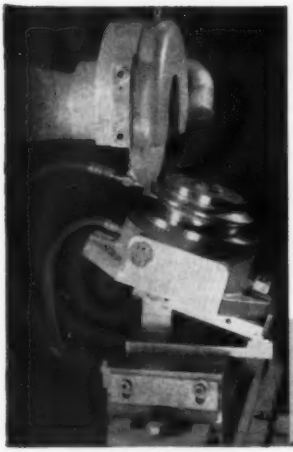
(not an index table)



With Lapping Plate

FASTER
circular precision grinding!

Now with this table and with less effort you assure highest standards of accuracy, flatness, finish and close tolerances. At the same time you eliminate slow and complicated tool setups. You cut grinding time greatly by using only cross feed while the table is rotating at infinite speeds between 40 and 100 RPM.



Work clamped to motorized table, mounted on sine plate. Surface grinder application.

For example, Vulcan's Rotary Table can be used in connection with a sine plate or angle fixture. The dressing of large expensive external wheels for side grinding is therefore eliminated. If you wish we can provide permanent magnetic chucks designed for use with our table, both 6″ and 10″ in diameter.

Vulcan's Rotary Table is an air operated, self contained unit, portable between bench or machine. A precision center hole for locating and tapped holes in the table for clamping provides easy setup. Circular surface grinder applications are many and varied — grind flanged studs or bushings — bearing spacers — forming rolls — cutters — convex or concave surfaces — punches or dies (radius or angle).

Lapping? Yes — and in micro inches. For the 6″ and 10″ table, lapping plates of 12″ and 16″ are provided. Perfect for lapping valve plates, gages, bearing spacers and for carbide lapping using diamond powder. *Write for circular.*

Major Vulcan Services

Engineering, Processing, Designing and Building . . . Special Tools . . . Dies . . . Special Machines . . . Vulcamatic Transfer Machines . . . Automation . . . including the Vulcan Hydraulics that Form, Pierce, Assemble and size. Vulcanaire Jig Grinders . . . Motorized Rotary Tables . . . Plastic Tooling.

VULCAN TOOL CO.

Highland and Lorain • Dayton 10, Ohio

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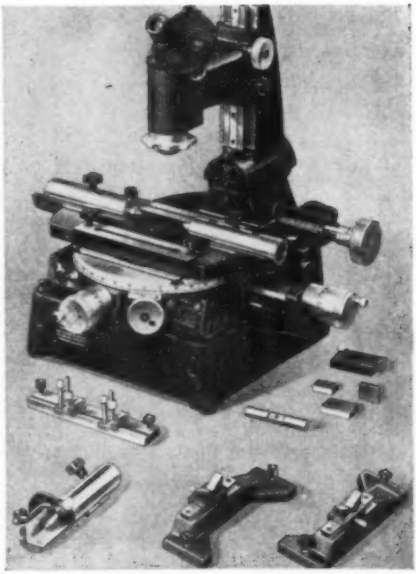
manually- and air-operated.
Other Products: Complete lines of toggle action clamps, pliers, and wrenches, manually- and air-operated.

LATROBE STEEL COMPANY
Latrobe, Pa.
Booth No. 451

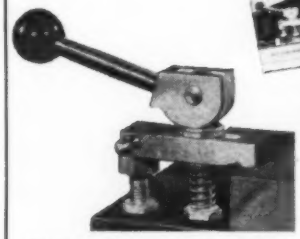
LECOUNT TOOL WORKS, INC.
Hartford, Conn.
Booth No. 1107
Personnel: J. H. Dowd, pres.; M. J. Lombardi, vice-pres.; Matthew Ostrowski, engineer.
New Products: Type B long straight jaw Count-Centric mandrel — wide range. Type M narrow range miniature Micromite expanding mandrel.
Other Products: Type A step jaw very wide range Count-Centric expanding mandrel.

K. O. LEE COMPANY
Aberdeen, S. D.
Booth No. 187

LEES-BRADNER CO., THE
Cleveland, O.
Booth No. 424
Personnel: George T. Bradner; Anson Laufer; E. Berry Thomas; Clayton Joecken; Jack Montean; Wm. Becks.
New Products: Profilap carbide tool lapping machine.
Other Products: Cri-Dan B and Cri-Dan E single point threading machines, under power and in operation.



Large toolmakers' microscope, Carl Zeiss Jena. (See page 218.)



WESPO **for ALL**
WORK-HOLDING NEEDS
TOGGLE CLAMPS
35 TYPES AND SIZES
NOTE These Features: Reamed holes—hardened serrated bushings—high tensile strength rivets.
STANDARD FIXTURE CLAMPS
15 STYLES · 136 SIZES
OVER 1000 COMPONENTS
TYPES AND SIZES
Write for Template Catalog
SEE US AT A.S.T.E. SHOW CHICAGO BOOTH 290
WEST POINT MFG. CO.
26931 West 7 Mile Road **Detroit 19, Mich.**

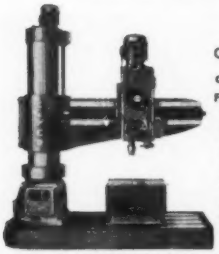
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SEE THESE OUTSTANDING MACHINES IN OPERATION AT THE ASTE SHOW

The Maserati Corporation of America will demonstrate four of its outstanding machine tools at the ASTE exposition.

Come and see how efficiently these high-precision, low-cost machines operate. . . . the BLOHM HFS-4 horizontal surface grinder, the CASER FR-1 Radial Drill, the WESTBURY 1-S vertical milling machine and WESTBURY 3-U Horizontal Milling Machine.

BOOTHS 1806 and 1907



CASER RADIAL DRILLS

MODEL FR-10/1250
Other Models FR-7, FR-9, FR-11

FEATURES:

Single push button clamping of column and head • Single control for power arm elevation • Single control starts, stops and reverses spindle with pre-selection of all speeds while machine is running • Speed dial permits speed and feed selection while machine operates • Single knob feed dial can be operated while machine is running and feed is engaged

Caser Radial Drills Are Available In The Following Sizes:

ARM LGTHS.	2'6"	3'	4'	4'	5'	6'	7'	8'
COL. DIAM.	8"	10"	12"	14"	16"	17"	22"	22"



WESTBURY VERTICAL MILLS

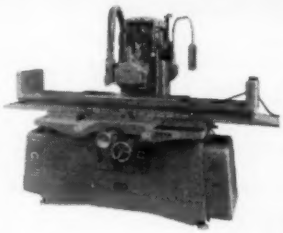
The Westbury 1-S and 1-R

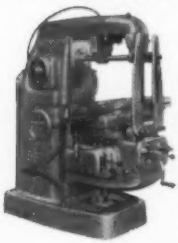
Hardened and ground high-speed ball bearing spindle — 5" quill travel, micrometer depth stop — Three feeds, .0016, .003, .005 — Rapid spindle change over, 8 speeds (80-2713) — Dovetailed overarm (1-S) — Round over-arm, (1-R) — Precision angle setting control — Rigidly mounted table — 42⅝" x 9½" — 30" longitudinal range, 10" transverse, 16" vertical — Positive locks — Motor, 1.5 hp — Weight, 2200 lbs. The Duplomatic Duplicating Attachment Mod. FR for Milling Machines. Hydraulic precision reproduction of molds, patterns, and templates, in any material

BLOHM HORIZONTAL SURFACE GRINDERS

Cross movement by the table assures maximum precision and accuracy. Powerful heavy-duty 5 H.P. motor mounted directly on spindle operating on adjustable oilmatic bushings; pressure lubrication; use wheels up to 4" with cross feed up to 2½" per stroke.

These features plus the unusually sturdy overall construction, eliminate virtually all vibration and assures maximum concentricity. Exclusive BLOHM MICRO-TIP in-feed and depth-feed control permits automatic fingertip adjustments up to .0002" on cross feed and .00004" in depth feed.





WESTBURY HORIZONTAL MILLS

The Westbury 1-U, 2-U, and 3-U;

Heat-treated, hardened spindle; all moving parts designed to withstand overloads in excess of 100% — Spindle mounted on adjustable tapered roller bearings — 12 speeds, 28 to 1100 rpm or 35 to 1600 rpm — dial and hand control for selecting and reversing — Splash lubricated spindle gear box, extra gear pump for added safety — Power feed and rapid traverse in all directions — Climb milling — Special safety devices prevent operating errors — All ways handscraped — Single lever engages rapid traverse to all movements

Representatives in Principle Cities

Write, Wire, or Telephone for descriptive literature.

MASERATI

MASERATI CORPORATION OF AMERICA — **WESTBURY, NEW YORK**

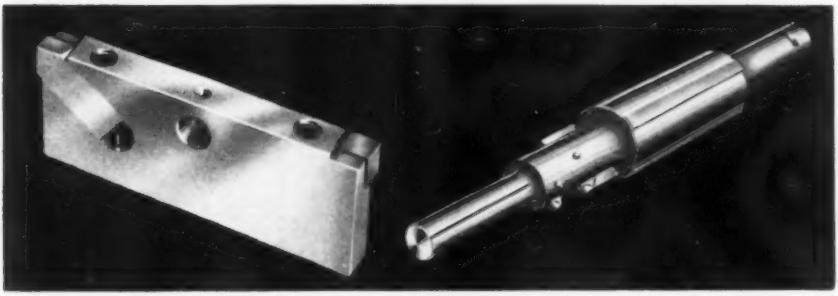
Encircle No. 384 on Card, Opposite Page 65

LEHMANN-FULTON BORING TOOL

VISIT BOOTH 213

A.S.T.E. INDUSTRIAL EXPOSITION

March 19-23 Chicago



- Modern production methods assure accurate interpretation of your specifications.
- Trained Lehmann-Fulton engineers are located in 32 major industrial centers ready to help solve your problems and develop tools for your special requirements.
- Send for your free copy of the new, fully illustrated Lehmann-Fulton Boring Tool Catalog.

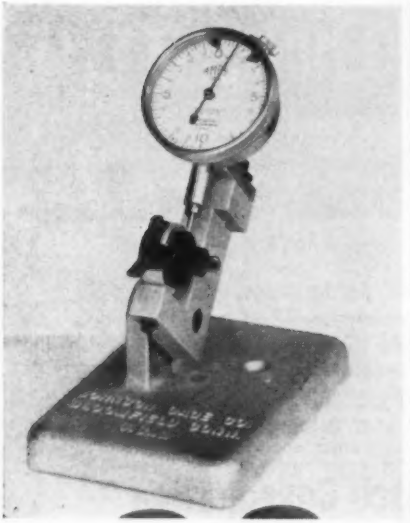
BLOCKS • BARS AND CUTTERS • STANDARD AND CUSTOM-MADE • IN ALL TYPES AND SIZES

LEHMANN BORING TOOL

DIVISION OF FULTON IRON WORKS COMPANY

4389 DUNCAN AVE. • ST. LOUIS 10, MO.

Encircle No. 385 on Card, Opposite Page 65



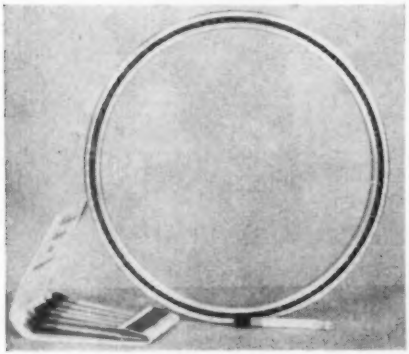
Johnson bench type pivotal screw-thread comparator. (See page 260.)

LEHMANN BORING TOOL, DIV. FULTON IRON WORKS CO.
St. Louis, Mo.

Booth No. 213

Personnel: T. J. Sleeter, chief engineer; Russell Cole, sales manager.
New Products: Animated automatic recessing tool.
Other Products: Block type boring bars; adjustable block cutters; solid block cutters; cutter blades, high speed steel; cutter blades, Stellite; cutter blades, tungsten carbide tipped.

Kaydon bearing. (See page 262.)



NEW PRECISION COMPAC INDICATOR
Ball Bearing Mounted

Made in 5 models.

Type	Graduations	Price
V-2	.0005"	$22.00
V-3	.0001"	28.50
V2G	.0005"	24.00
V3G	.0001"	31.50
V2GL	.0005"	31.50

Adjustable axial holder 3/8" diameter shank $6.00

Parts and service

Write for catalog



Model V2GL

BOREL & DUNNER COMPANY
19313 Farmington Rd. Livonia, Mich.
Dealer Inquiries Invited

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Save 80%

Machine Moving Time



Mighty Mover heavy duty dollie

- Load capacity to 100,000 lbs.
- Top plate swivels, 360° directional control
- Nothing to wear out—nothing to maintain
- Two 4-inch roller bearing cast iron dollies

MIGHTY MOVER COMPANY
1479 S. Milwaukee St. Denver 10, Colo.

Encircle No. 387 on Card, Opposite Page 65

IF YOU must cut production costs

THEN

ELIMINATE MACHINING! in the following operations:

Accurate location and securing drill jig bushings,
Anchor bearings and parts in machinery,
Anchor bushings in abrasive wheels,
Center and secure shafts in Alnico rotors.

Write for Bulletin A1 today — it tells how. Better still — come see our demonstration at Booth No. 773, A.S.T.E. Exposition—Chicago, March 19-23. See above and many other applications.

CERRO DE PASCO CORPORATION

294 Park Avenue, New York 22, N. Y.

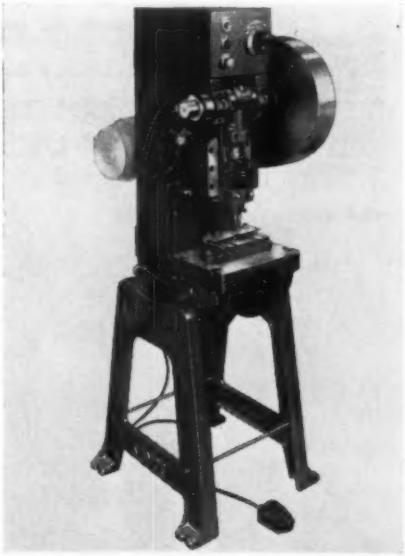
Encircle No. 388 on Card, Opposite Page 65

LEMPCO INDUSTRIAL, INC.
Bedford, O.
Booth No. 519
Personnel: R. J. McIntyre

LENZ CO., THE
Chicago, Ill.
Booth No. 1702
Personnel: Ed Anderson

LINDBERG ENGINEERING CO.
Chicago, Ill.
Booth No. 1201
Personnel: P. E. Bjork; R. T. Trebing; L. R. Farrell; K. Van Beek; R. Prest; K. Freutel; L. Duda; W. Dinzik; Q. Kenny; W. Klein.
New Products: A 5 kw induction heating unit, in operation, demonstrating a newly designed coil for edge heating.

LINDE AIR PRODUCTS CO., DIV. OF UNION CARBIDE AND CARBON CORP.
New York, N.Y.
Booth No. 931
Products: Presented will be the Flame-Plating story, which is a process which Linde developed for coating selected areas of parts and tools with tungsten carbide for extreme resistance to wear. Displayed will be a selection of products of other manufacturers which have been coated with tungsten carbide. The display will be subdivided under the following headings: Machine Tool Parts; Seals and Bushings; Industrial Cutting Knives; Industrial Gages; and Screw Machine Parts.



Kenco Model 15 punch press. (See page 262.)

POPE PRECISION SPINDLES

***Of Special Interest and Value To All* TOOL ENGINEERS**

See these Spindles at Federal Machinery Sales Co., Booth No. 392, ASTE Show

EXHIBIT A

POPE SUPER-PRECISION, HEAVY DUTY BORING SPINDLES for boring holes round within millionths of an inch. Available in both belt driven and motorized units to meet a wide range of speeds and horsepower. Send us your specifications for quotations.

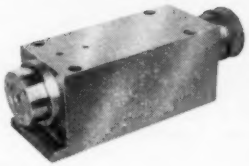


EXHIBIT B



POPE 1 HP, TOTALLY ENCLOSED 3600 RPM MOTORIZED, CARTRIDGE TYPE PRECISION SPINDLES with double row cylindrical roller bearings and separate thrust bearings for no endwise movement of the shaft

EXHIBIT C



NEW **POPE** QUICK, SELF-REMOVING WHEEL HOLDER for surface grinders and tool and cutter grinders — eliminates the necessity of a wheel puller. Write for quotations.

EXHIBIT D



POPE HEAVY DUTY, ¾ TO 100 HP DIRECT MOTORIZED SPINDLES for Horizontal or Vertical Skin Milling, Grinding, Milling, Boring and Other Operations

EXHIBIT E



POPE SUPER-PRECISION MOTORIZED TOOL AND CUTTER GRINDER SPINDLES with clearance Angle Swiveling Heads for *Angular Adjustment In A Vertical Plane*

EXHIBIT F



POPE HEAVY DUTY VEE-BELT DRIVEN, PRECISION MILLING SPINDLES, and Wheel Heads, ½ to 50 HP

EXHIBIT G



POPE INTERNAL GRINDING SPINDLES for Bryant, Excello, Heald and Landis Grinders.

EXHIBIT H



POPE SUPER-PRECISION HIGH FREQUENCY HEAVY DUTY GRINDING AND MILLING SPINDLES for speeds up to 100,000 RPM

WRITE FOR COMPLETE SPECIFICATIONS, PRICE AND DELIVERY

No. 108

Specify **POPE** PRECISION SPINDLES

POPE MACHINERY CORPORATION

Established 1920

261 RIVER STREET · HAVERHILL, MASSACHUSETTS

Encircle No. 389 on Card, Opposite Page 65

F. J. LITTELL MACHINE CO.
Chicago, Ill.

Booth No. 589

Personnel: F. N. Littell; W. J. Littell; S. Budlong; R. E. Miller; G. U. Moran; R. Johanson; C. E. Monell; J. P. Monell; C. F. Netzler.
Products: Double rack and pinion roll feed; reels; straightening machines; hydraulic feeding and straightening machines.

LODDING INCORPORATED
Worcester, Mass.

Booth No. 735

Personnel: L. L. Krasnow, sales mgr.; R. B. Bagby, dist. sales mgr.; J. Bagby, sales eng.; D. J. Milliken, gen. mgr.; E. R. Ljungquist, factory mgr.; J. Cooper, sales eng.
New Products: Nut, cam, knob and air operated retracting clamp assemblies.
Other Products: Standard jig and fixture components, clamp assemblies, spring jacks, and heavy duty jacks.

LOGAN ENGINEERING CO.
Chicago 30, Ill.

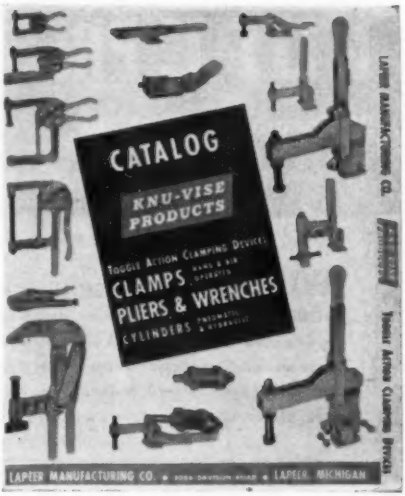
Booth No. 900

Personnel: L. H. Fenwick, T. L. Hedgpeth, R. Lull, R. Prezbieda, G. Erickson.
New Products: Logan Vertical Mill.
Other Products: Logan lathes, Logan shaper.

LOGANSPORT MACHINE CO., INC.
Logansport, Ind.

Booth No. 245

Personnel: C. H. Wilkinson, pres.; H. J. Peppercorn, vice-pres.; L. R. Burger, sales mgr.; H. L. Stewart, asst. sales mgr.; J. Moritz, chief draftsman; A. J. Moore, Sr., sales eng.
New Products: Complete line of solenoid

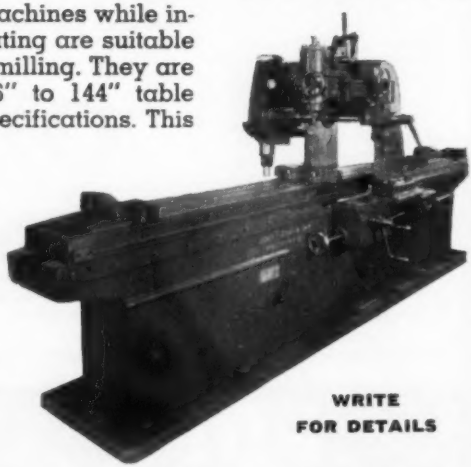


New catalog of Lapeer Mfg Co. (See page 266.)

BURR *KEYSEAT MILLING MACHINE, PLANER TYPE*

The Burr Keyseat Milling Machines while intended primarily for keyseating are suitable for a large variety of plain milling. They are made in six sizes from 36" to 144" table length. Also built to your specifications. This is a sturdy, heavy-duty machine equipped with a vertical head and Timken anti-friction bearings throughout.

Also Burr Portable Shaft Keyseaters in five sizes for hand, drill and motor operation.



JOHN T. BURR & SON, INC.
Established 1890

WRITE FOR DETAILS

429 KENT AVENUE • BROOKLYN 11, NEW YORK

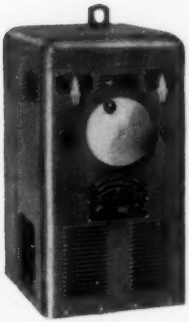
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When one welder gives both AC and DC . . .

Handles every type of electrode . . .

Yet costs less to buy and operate . . .

WHY shouldn't you be using IDEALARCS for your production welding.



IDEALARC . . . *one efficient welder for all your jobs.*
Furnished as an AC/DC welder or as a straight AC welder to which DC can be added at any time.

IDEALARC . . .

industry's most versatile welder

Certain electrodes work best on AC . . . others operate better on DC. Some rods that work best on DC in the smaller sizes work best on AC in the larger sizes. With still other rods, the opposite is true. IDEALARC, with its instant selection of AC or DC, gives optimum performance on every type and size of electrode.

There is no other welder like it

THE LINCOLN ELECTRIC COMPANY
Cleveland 17, Ohio

ONE DEPENDABLE SOURCE FOR ALL YOUR WELDING NEEDS

© 1956 The Lincoln Electric Company

SEND FOR BULLETIN 1343
MAIL COUPON OR WRITE

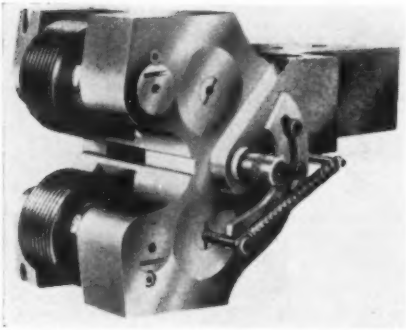


THE LINCOLN ELECTRIC COMPANY
Dept. 3607,
Cleveland 17, Ohio

☐ Send me Bulletin 1343 on Idealarc.
☐ Have representative call.

Company_____
Address_____
City_____ State_____
Name_____
Position_____

Encircle No. 391 on Card, Opposite Page 65

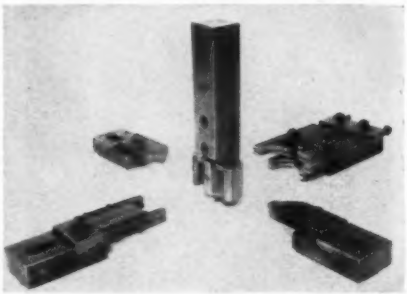


Landis Machine thread rolling attachment.
(See page 266.)

pilot operated hydraulic control valves; Ultramatic air and hydraulic cylinders; lubricator, regulator, and filter unit.
Other Products: Complete line of air and hydraulic devices.

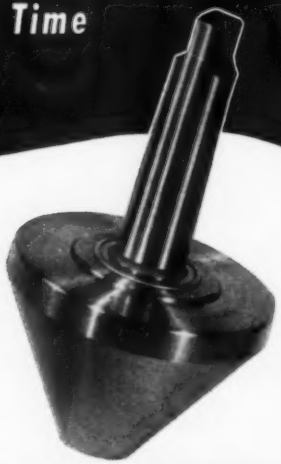
LOVEJOY TOOL COMPANY, INC.
Springfield, Vt.
Booth No. 184

LUFKIN RULE CO., THE
Saginaw, Mich.
Booth No. 598
Personnel: L. Barnard, W. Bayer, E. Bohsstedt, H. DeVore, J. Doman, Fred Grattopp, A. Hilliert, F. Holnagel, D. Lone, F. Metevier, Don Oltz, R. Rasmussen, R. Ristow, W. Rockwell, Bud Schlitt, T. W. Wise, T. Young, C. Zelnick.
New Products: 1" wide planer gage with both rapid and fine adjustment features; micrometer with new cam lock; micrometer with a deep throat for gaging steel sheets, bars, plates, etc.; machine divided steel rules with American Standard decimal fractions; several new magnetic base tools.
Other Products: Complete line of pre-



Linde Flame-Plated wire forming mandrel.

PERFECT ALIGNMENT *Every Time*
with ROOFE Heavy-Duty
BULL NOSE CENTERS



Two double rows of quality bearings in the large and small ends of the nose of this live center are your assurance of perfect alignment on any type of work.

Two shank sizes provide diameters from ½" to 7½" for a wide range of work with a single center.

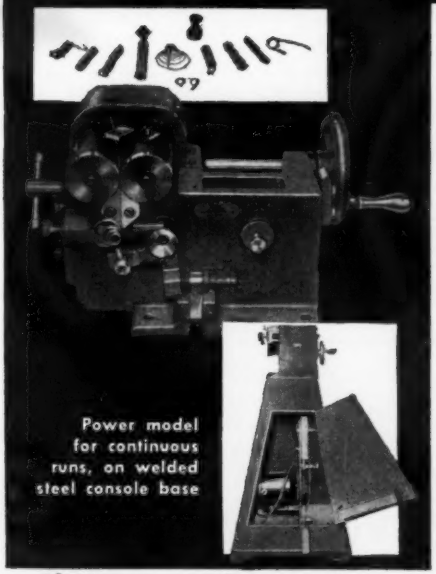
Write now for complete catalog of all types of ROOFE Live Centers.

HOUSTON GRINDING & MFG., CO., Inc.
2110 QUITMAN STREET • HOUSTON 10, TEXAS
Reliable Distributors Wanted

Encircle No. 392 on Card, Opposite Page 65

Make any type spring, without arbors, FAST with Perkins Spring Coiler!

When you need a replacement or experimental spring, any shape, diameter or pitch from flat or round wire sizes .005″ to .125″, you can produce it in a matter of seconds with the new Perkins Precision Spring Coiler! You entirely eliminate the use of arbors, yet turn out precision springs — torsion, compression, extension tapered, or special springs — coiled either left or right hand, in any desired length, any diameter from 1/16″ to 12″ and larger, with or without initial tension, and with open or closed ends. Eliminate expensive special orders and costly production delays! Make your own springs to exact specifications for replacements or experimental work. Make them fast right in your own shop!





Hold any machine work at any EXACT angle with sturdy OMNI-VISE!

Accurately set in all three planes in only 15 seconds, this sturdy precision vise made in two capacities saves time and headaches for progressive shop operators and pays for itself quickly. Only 7″ high (lowest in the trade), **OMNI-VISE** #4, shown at top, is tough, weighs 74 lbs. Jaws are 4″ x 1½″, open to 4″. Base is 9″ in diameter with one side straight. Inset shows **OMNI-VISE** #2, a precision low-priced vise. Users find it exceptional for grinding compound angles on carbide tools. Weight, 16 lbs. Height, 4¾″. Jaws, 2⅛″. Opening, 2⅛″. Base, 7¼″ x 5″. For grinding, drilling or general work at any angle, by hand or machine, an **OMNI-VISE** is the machinist's choice.

EXCLUSIVE DISTRIBUTORS OF PRECISION MACHINE TOOLS

Connors and Davis Sales Corporation

CIRCUIT AVENUE, WEST SPRINGFIELD, MASS.

CONNORS AND DAVIS Sales Corp.
603 Circuit Ave., West Springfield, Mass.

Please send detailed information and prices on:

PERKINS SPRING COILER hand ☐ power ☐

OMNI-VISE #4 ☐ #2 ☐

Name_____ Title_____

Company_____

Address_____

City_____ State_____

cision tools, including outside micrometers, inside micrometers, depth gages, precision end measuring rods, vernier height gages, combination squares, diemakers squares, bevels, protractors, dial indicators, precision and machinists' levels, adjustable parallels, planer and shaper gages, trammels, calipers and dividers, hold downs, magnetic base tools, steel rules, tapes.

M-B PRODUCTS, DIVISION TOOL SALES COMPANY
Highland Park, Mich.

Booth No. 557

do you have a

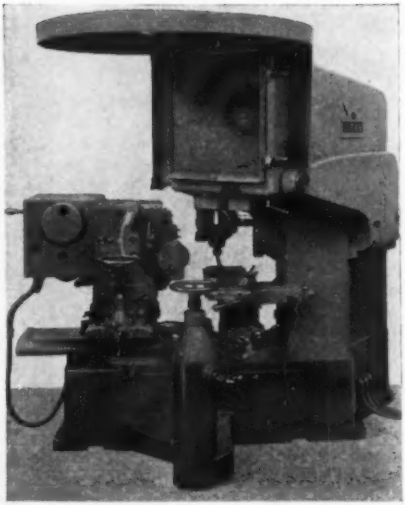
TOOL PROBLEM

Columbus Die-Tool has been solving tooling problems for over 45 years. Expert designers and builders of all types of tools and special machinery. Write us today!

COLUMBUS DIE-TOOL and Machine Co.

P. O. BOX 750 • COLUMBUS, OHIO

Encircle No. 394 on Card, Opposite Page 65



Loewe optical profile grinder Model SP, Eric R. Bachman Co., Inc. (See page 158.)

M. B. I. EXPORT & IMPORT
Bronx, N.Y.

Booth No. 563

Personnel: G. F. Kullack

McCROSKEY TOOL CO.
Meadville, Penna.

Booth No. 1117

Personnel: J. Foulk; H. D. Gage; W. D. Getchell; D. Sykes; R. W. Thomas; C. D. Tucker.

Products To Be Shown: Inserted-blade cutters—reamers, milling cutters, boring bars, special tools.

MAC-IT SCREW DIVISION, STRONG, CARLISLE & HAMMOND CO.
Cleveland, Ohio

Booth No. 906

MADISON MANUFACTURING CO. & MADISON INDUSTRIES, INC.
Muskegon, Mich.

Booth No. 1209

COOPER WEYMOUTH

OPEN THROAT

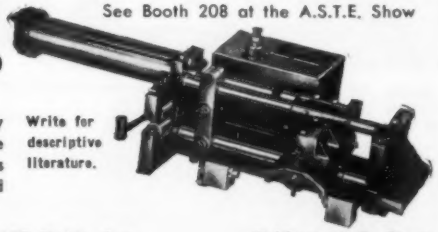
AIR OPERATED SLIDE FEED

For Power Press Operation

Operates on standard shop air lines. Easy to set up and adjust, holds to extreme accuracy. Made in five sizes. Feeds lengths to 36", up to 18" wide on mechanical and hydraulic presses.

See Booth 208 at the A.S.T.E. Show

Write for descriptive literature.



COOPER WEYMOUTH, INC. 277 Noble Ave. Bridgeport 8, Conn.

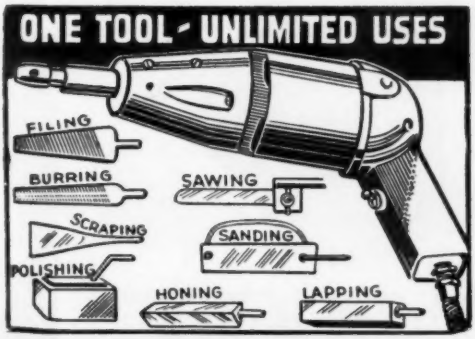
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B-R-E-A-K...
Hand Finishing Bottlenecks

with
Portable • Electric
Reciprocating Tools

These handy tools will cut out many tedious hand filing and finishing operations — Increase Production — Produce Uniform Work.

Light in weight — Delivers 1/8" or 3/8" fixed stroke at 1000 strokes per minute — Operates on 110 volts AC or DC.



ACME TOOL COMPANY
71 WEST BROADWAY **NEW YORK 7, N.Y.**

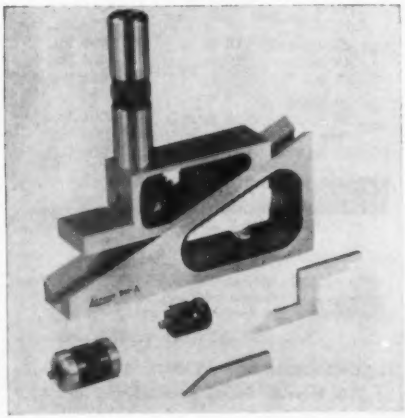
Encircle No. 396 on Card, Opposite Page 63

MAGNAFLUX CORPORATION
Chicago, Ill.
Booth No. 820

MALL TOOL COMPANY
Chicago, Ill.
Booth No. 738

MANCO MANUFACTURING CO.
Bradley, Ill.
Booth No. 708

Lufkin No. 901A planer gage. (See page 276.)



MARATHON DIE SET
Chicago, Ill.
Booth No. 1821

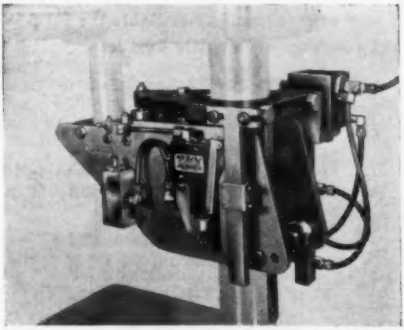
Personnel: W. S. Ataras

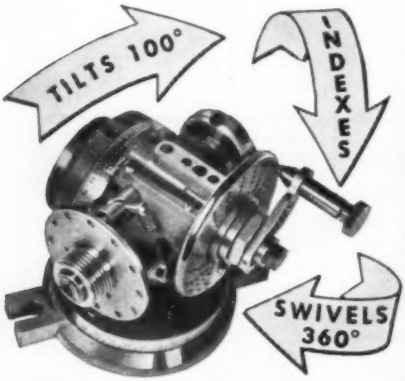
MARTIN ENG. CO.
Neponset, Ill.
Booth No. 761

Personnel: C. G. Matson; E. F. Peterson; E. H. Peterson; Ralph Ebener; E. W. Szafranko; Rives Pirtle; Mauritz Peterson.

New Products: Silent pneumatic vibrator for use on feed chutes on grinders, punch presses, secondary and

Mead Specialties air-hydraulic drill press feed. (See page 281.)





FOR FASTER PRODUCTION

THE ELLIS

DIVIDING HEAD

Although it is built to fine instrument standards, the ELLIS is a really *rugged* tool room or production tool that's designed for unusual versatility. Its universal motions — swiveling in two planes — will save time and increase profits and accuracy on your millers, grinders, drill presses and jig borers. It has 6½" swing, or 11" swing when used with riser blocks. Work may be held between centers, or in chucks or collets. To save rehandling of work, and to save money, investigate the ELLIS by writing for complete details!

NICHOLS MORRIS CORPORATION

76-G MAMARONECK AVE.

WHITE PLAINS, N. Y.

Encircle No. 397 on Card, Opposite Page 65

Balancing Tools for a Wide Range of Work



Here's a complete line of Balancing Tools which will save their cost quickly on balancing or truing operations. Accurately sensitive and durable, they provide a simple, reliable means for checking the balance of parts like gears, shafts, fly wheels, pulleys, etc. The standard sizes available are shown in capacity chart below.

CAPACITIES

Swing	Between Standards	Weight Capacity
21 in.	20 in.	12 lbs.
21 in.	20 in.	800 lbs.
43 in.	29 in.	800 lbs.
43 in.	29 in.	2,000 lbs.
6 ft.	5 ft.	5,000 lbs.
8 ft.	8 ft.	10,000 lbs.
Any	Any	24,000 lbs.
43 in.	30 in.	800 lbs.

FREE DATA



SUNDSTRAND

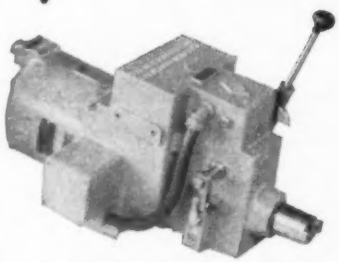
You can obtain complete information on Sundstrand Balancing Tools by writing for bulletin 466.

SUNDSTRAND MACHINE TOOL CO.

2535 Eleventh Street, Rockford, Ill., U.S.A.

Encircle No. 398 on Card, Opposite Page 65

NEW Heavy Duty Fen Automatic Wrench



Illustrated above is the Model 4MH showing the heavy duty construction.

The Model 4MH Fen Automatic Wrench was designed for hi-duty cycle. Therefore, it can be used on hi-production automatic equipment. The Model 4MH incorporates an impact reactor which reduces the load on the fixture and increases the life of the holding device.

For detailed information regarding the application of the Fen Automatic Wrench to your machines, phone, wire or write.

THE FEN MACHINE COMPANY
28915 LAKELAND BLVD.
WICKLIFFE, OHIO

Encircle No. 399 on Card, Opposite Page 65

assembling operations; explosionproof vibrator for operation on steam or compressed air.
Other Products: Tachometer with tunnable reed for rpm and vibration determinations from 2000 to 21,000 cpm. Full line of silent vibration inducers (T. M. Vibrolator), ranging from 4 oz. to 14 lb.

MARVEL ENGINEERING CO.
Chicago, Ill.
Booth No. 1028

MASTER CHEMICAL CORP.
Toledo, O.
Booth No. 1133
New Products: Trim Mist; Trim Clear; Trim Ti-Grind.
Other Products: Trim coolant. Small molecules allow thorough wetting action. Bacteria cannot grow in this coolant, so offensive odor is eliminated.

MASTER PNEUMATIC TOOL CO.
Bedford, Ohio
Booth No. 608

JAS. H. MATTHEWS & COMPANY
Pittsburgh, Pa.
Booth No. 662

MAYLINE COMPANY, INC.
Sheboygan, Wis.
Booth No. 1036

MEAD SPECIALTIES CO., INC.
Chicago, Ill.
Booth No. 215
Personnel: H. O. Henwood, vice-pres.-sales mgr.; E. G. Case, Rotert Thorsen, Clare Rych, sales eng.
New Products: Fluid Feed air-hydraulic drill press feed; sanding and deburring machine.
Other Products: Air cylinders; valves; timers; work feeders; air presses; air vises; air collet fixtures; air impact hammers.

MELARD MFG. CORP.
New York, N.Y.
Booth No. 1009
Personnel: Harold Shames

MERRILL ENGINEERING LAB'S
Denver, Colo.
Booth No. 125

MERZ ENGINEERING, INC.
Indianapolis, Ind.
Booth No. 540

METAL CARBIDES CORP.
Youngstown, O.
Booth No. 1300
Personnel: R. T. Beeghly; J. A. Ritz; C. S. Banner; J. R. Workman; P. H. Kechler; J. L. Fuller; W. E. Burke; G. E. Myers; B. C. Brewen; S. A. Ernst; C. S. Stelmack; A. C. Soulen.
New Products: Tungsten carbide cutting tools, cutting tips, draw dies, centerless grinder blades, drill jig bushings, lathe centers, plug and ring gages, sand blast nozzles, rolling millwork rolls, Klamp-Lok toolholders, heavy metal high density alloy, diamond wheel dressers,

diamond grinding wheels, diamond core drills.
Other Products: Booth will include a miniature animated display of a production line producing tungsten carbide cutting tools from powder to finished tool. On display will be the largest tungsten carbide draw die ever made, the longest piece of tungsten carbide ever made, and the largest tungsten carbide steel mill roll ever made.

METAL CUTTING TOOLS, INC.
Rockford, Ill.
Booth No. 1143

METAL LUBRICANTS COMPANY
Chicago, Ill.
Booth No. 666

METAL REMOVAL COMPANY
Chicago, Ill.
Booth No. 617

MICROMETRICAL MANUFACTURING CO.
Ann Arbor, Mich.
Booth No. 774

MICRO-POISE ENGINEERING & SALES CO.
Detroit 27, Mich.
Booth No. 642
Personnel: J. P. Lannen, R. J. Lannen, E. J. Harmon, H. S. Mueller, F. W. Schumann, N. K. Found, R. C. Colburn.
New Products: Production precision balancing machines.

MILFORD RIVET & MACHINE CO., THE
Milford, Conn.
Booth No. 453
Personnel: F. H. Merwin; V. L. Bradford; R. M. Gordon; R. K. Duer; G. K. Tollaksen; W. T. Peterson; W. T. Stevenson; E. Hess; H. Q. Gamble; A. D. Moore; H. T. Smith; J. Hulburt; E. Johnson.
New Products: Model 250 riveting machine; toggle action riveter, complete with hopper feed mechanism; Horton type roller clutch electric drive suitable for a maximum rivet gauge of 3/16" shank dia. by ¾" length.
Other Products: Five standard models of rivet setting machines; standard tubular and split rivets; cold headed specialties.

MILLER FLUID POWER CO.
Melrose Park, Ill.
Booth No. 429-37-41
Personnel: F. Flick, pres.; H. B. Rasmussen, sales mgr.; C. Dauer, W. Kudlaty, D. Boox, D. Morgan, E. Ahrendt, W. Turner, R. Wilkes, C. Yant, J. Frick, others.
New Products: Improved cylinder with following features: case-hardening, chrome-plated piston rods, "Teflon" rod wipers, and hydraulic piston rod seals, rust-resistant black ferric oxide finish on cylinder heads, caps, mountings, tie rods, pistons, followers, and the unplated portions of the piston rods. "True-Seal" seal-fitting for leak elimi-

Save Time . . . Labor . . . Materials with



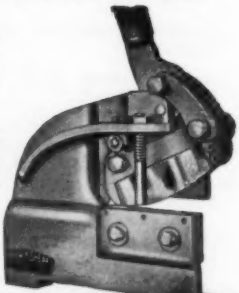
Inside SLOTTER
Makes cuts up to 8" inside edge of sheet. Sharp, clean burr-free cuts always assured. Cap. 16 ga. High strength aluminum alloy body; H.C.H.C. blades.

BEVERLY metal cutting SHEARS

Throatless SHEAR
Make any cut—straight, irregular, curved. Exclusive design permits turning work any direction while cutting. 4 models—cap. to 3/16".



Slitting SHEAR
New "55" Series—easier cutting with compounded linkage. 3 models—cap. to 3/16"; trimming capacity to 5/16" mild.



See your Beverly Distributor. Write for FREE illustrated Bulletin.

Beverly **SHEAR MFG. CO.**

3005 W. 111th STREET • CHICAGO 43, ILLINOIS

Encircle No. 400 on Card, Opposite Page 65

Get the complete, revealing

Inside Story

on the finest tapping heads ever made!

Here's a feature by feature analysis on the amazing Procunier tapping line which clearly explains why they have consistently maintained tapping superiority in the industry for over 30 years! A true "peep-hole" story on the many outstanding construction improvements, the mechanical advancements and precision quality operating advantages that make Procunier heads a "must" in production plants everywhere! You'll learn why Procunier means more tapping hours with a minimum of "down-time" interruptions, accelerated production with fewer broken taps, fewer spoiled pieces and a "new-found" operating ease and convenience that helps operators maintain stepped-up production schedules. "Do more tapping, better, for less" is the slogan in progressive plants who have adopted Procunier heads in *their* tapping departments.



Exclusive!

Tru-Grip Tap Holder

A patented feature providing perfect tapping action close to walls and shoulders.

Find out how you, too, can benefit with Procunier—

Write for Free Brochure Today

PROCUNIER

SAFETY CHUCK COMPANY

14 S. Clinton St.

Chicago 6, Ill.

Procunier Safety Chuck Co.
14 S. Clinton St., Chicago 6, Ill. Dept. 3

Gents: Send me your illustrated "Inside Story" —fast!

Name .....

Address .....

City ..... Zone..... State.....

Encircle No. 401 on Card, Opposite Page 65

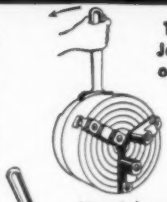
Labor Saving Production CHUCK

Will pay for itself in 60 to 90 days

On turrets, engine lathes, cutting-off machines, drill presses or any type of chucking machine, the Barker Two-Jaw or Three-Jaw hand operated chuck will increase production up to one third and actually pay for itself while doing it in from 60 to 90 days. Hand lever eliminates pneumatic and hydraulic systems, yet closes and locks jaws with lathe running or stopped. Over 30 years of labor saving, production boosting operation.

Write for bulletin 201 today.

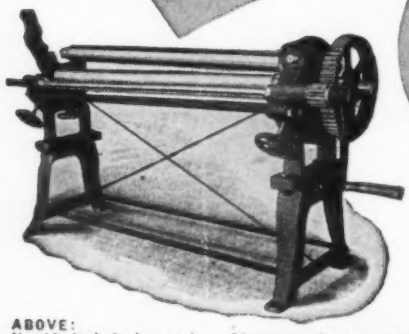




CHUCK DIVISION
THOMAS HOIST CO.
24 S. HOYNE CHICAGO 12, ILL.

Encircle No. 402 on Card, Opposite Page 65

Beloit SLIP ROLL HAND FORMING MACHINE



Operates to full rated capacity by hand or by power! Compact and heavy duty for years and years of hard usage. The two feed rolls, geared together, assure positive feed on even the thinnest material. The third roll is idle but can be made for gear drive at nominal cost. Completed work is easily and quickly removed. Made in bench and floor models, single and double back geared.

Write for complete details.

ABOVE:
No. 14 single back geared sliproll, floor model with capacity of 14 ga. 31 other models to meet every need.

Also manufacturers of Punches, Shears, Rod Cutters, Bending and Straightening Rolls.

HENDLEY & WHITTEMORE CO.
100 Blackhawk Blvd. Beloit, Wis.

Encircle No. 403 on Card, Opposite Page 65

INDEXING TURNTABLES



CAMS



Eisler makes over 100 different types of indexing mechanisms for spraying, glass insulators, melting and glass glazing with rotating stations and motorized or hand operated. Rotating tables of all kinds for over 35 years. We supply any part or complete equipment and we make special turntables and cams to your specifications. You are invited to see our showroom and see for yourself our many models on display. Write or call for our new catalog No. 88-55.

CHARLES EISLER JR., PRESIDENT
EISLER ENGINEERING CO., INC., 762 So. 13th Street, Newark, N. J.

Encircle No. 404 on Card, Opposite Page 65

nation at pipe threads, threaded fittings, and threaded connections.

MODEL MACHINE COMPANY, INC.
Philadelphia, Pa.

Booth No. 739

MODERN DEVICES
Libertyville, Ill.

Booth No. 533

MODERN INDUSTRIAL ENGINEERING CO.
Detroit, Mich.

Booth No. 613

Personnel: W. H. Bibbens; E. M. Stay; H. J. Crain; C. J. Berini; G. Martin; A. Eichman.
New Products: Burr-Master internal No. 15 automated; rear axle Hypoid tooth grinder; Burr-Master external duplex. Automatic deburring and chamfering of the entire tooth form of internal gears and splines is handled on the BMI-15.
Other Products: Burr-Master internal No. 14; Burr-Master external No. 14; Burr-Master external electric clutch 24S.

MODERNAIR CORPORATION
San Leandro, Calif.

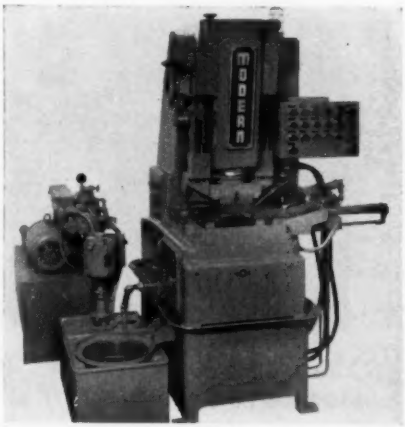
Booth No. 237

Personnel: J. E. Goldring, pres.; W. W. Burke, factory sales mgr.; Lloyd Cowdin, asst. sales mgr.
New Products: Air clamps; No. 600 sleeve valves; speed control valves.
Other Products: Line of cylinders and valves for air and low-pressure hydraulics.

MOHAWK TOOL INC.
Montpelier, Ohio

Booth No. 777

Modern Industrial Engineering BMI 15 Automated.



CONCENTRIC LIVE CENTERS

the original, patented spring loaded live center



FASTER SPEEDS
AUTOMATIC THRUST ADJUSTMENT

Smaller turning radius gives much higher RPM rate than ordinary live centers.

Spring loaded spindle gives automatic tail stock adjustment.

LESS OVERHANG MEANS MORE RIGIDITY. . MORE WORKING RANGE

GREATER LOAD CAPACITY
LONGER LIFE
JAM PROOF

Write today for complete information

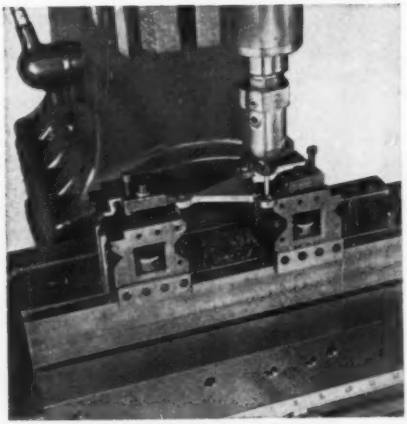
Pat No. 2,520,473

CONCENTRIC TOOL CORP 2486 Huntington Drive, San Marino, Calif

Encircle No. 405 on Card, Opposite Page 65

USE THE CAPACITY FOR WHICH YOUR MACHINE IS DESIGNED

A Solution to Your Work-Holding Problems



• THE HANSON HOLDING FIXTURE is adaptable to Jig Borers, Jig Grinders, Vertical Mills, Duplicators etc. This fixture is permanently square and in-line with the ways of the machine. Therefore, its accuracy is unsurpassed in its application to Work Holding.

It need not be removed. To accommodate various jobs, simply loosen the Sliding Blocks and respace to the size required. Due to the precision, the Sliding Blocks are instantly re-located at any time.

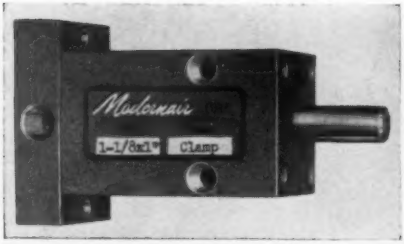
It effects great savings in set up time as the Work Piece is aligned by the fixture, thereby eliminating the otherwise necessary indicating for squareness. Duplicate Pieces can be machined with the same accuracy as the original without duplicating the set-up time.

THE HANSON HOLDING FIXTURE eliminates distortion of the Work Piece due to its unique method of holding.

HANSON & COMPANY

6527 RUSSELL ST. • DETROIT 11, MICHIGAN

Encircle No. 406 on Card, Opposite Page 65



Modernair air clamp.

MONRAY CORPORATION
Dearborn, Mich.
Booth No. 1033

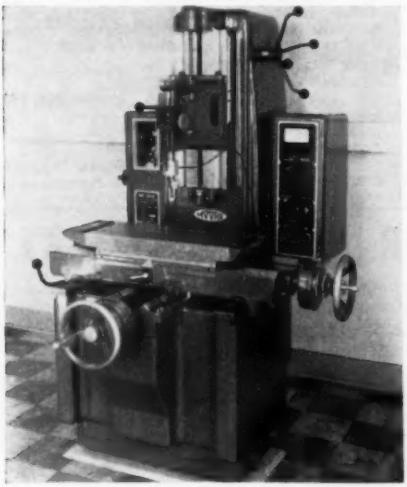
MOORE PRODUCTS COMPANY
Philadelphia, Pa.
Booth No. 624

MOORE SPECIAL TOOL CO.
Bridgeport, Conn.
Booth No. 1430

Personnel: R. F. Moore, pres.; Edward Shaw, sales mgr.; F. C. Victory, chief eng.; Carl Larson, chief inspector; Floyd Hawley, Service eng.; G. M. Lamb, F. E. Jennings, sales eng.

New Products: Universal measuring machine; ½" boring chuck set complete with accessories; Solid type boring bars; motorized centers; Model 2 precision type 11" dia. rotary table; other hole location accessories. The universal measuring machine combines capacity for larger workpieces, choice of electronic indicator supported on a rotatable spindle or a universal microscope for pickup, and a combination of rectilinear and angular positioning making possible the measurement of complex contours.

Moore universal measuring machine.





Encircle No. 407 on Card, Opposite Page 65

BALD EAGLE SINE BARS and PLATES

GUARANTEED PRECISION* at LOW COST



10" Hinged Sine Plate $265.00

This new No. 1810 Hinged Sine Plate has our exclusive locking device for rigid setups, heavy duty side and end plates, and a .1000" step for small angles.

*All models guaranteed accurate within .0002" for center distance and parallelism. Made of finest materials, double normalized for maximum stability, precision ground for accuracy. Use with magnetic chuck or clamp work with tapped holes.

Write for literature and low prices on the complete line of Bald Eagle Sine Bars and Plates.

Call your dealer or wire collect for immediate shipment



Bald Eagle Tool Co.
357 Minnesota St. • St. Paul 1, Minn.

Encircle No. 408 on Card, Opposite Page 65

MORRISON ENGINEERING CO.
Chicago, Ill.

Booth No. 332

MORSE CO., H. E.
Holland, Mich.

Booth No. 1010

Products: Exhibited will be the Comparoscope, an instrument for quick evaluation of all surface finishes, including flat surfaces, outside diameters, inside diameters, shoulders, and bottom of blind holes.

MOTCH & MERRYWEATHER MACHINERY CO.
Cleveland, O.

Booth No. 1021

New Products: Triple C cutting coolant is clear, cool, and clean (hence the name, "Triple C"). It is water soluble, harmless to touch, nonflammable, nongalling, nongumming, anti-rust.

Other Products: Triple-Chip segmental saw blades, the largest being an 84" dia. blade; Kroslok face milling cutters and shell end mills, 3" through 32" dia.; Triple-Chip solid saw blades for metal cutting; Triple-Chip slitting and slotting saw blades, 3" through 8" dia.; dual drive adaptors, used in slitting and slotting operations for protection to the blades; Triple C grinding coolant.

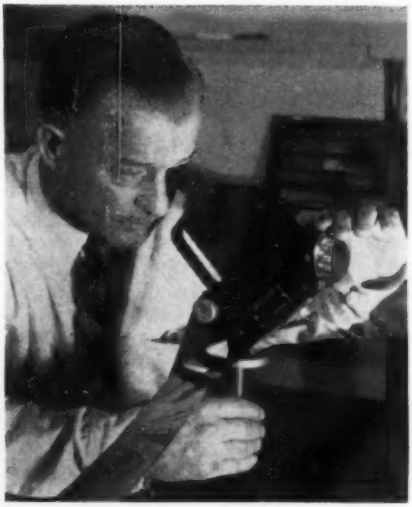
MYER CORPORATION
Cranston, R.I.

Booth No. 908

NATIONAL BROACH AND MACHINE CO.
Detroit 13, Mich.

Booth No. 816

Products to be Shown: Red Ring auto-



Morse Comparoscope for evaluating and surface finish.

NIELSEN
Heavy Duty
Live Centers
Write for catalog on live centers



Adapted for heavy duty work. Precision type ball and roller bearings assure maximum capacity for high speed production and long service.

NIELSEN, INC. LAWTON, MICH.

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SPACE SAVERS

RACKS FOR ALL BAR STOCKS



Keep your bar stock within easy reach and conserve 75% of your storage space. Eliminate handling accidents. YOHE racks placed back to back increase storage efficiency. Stock always visible. Write for literature and prices today. . . .

THE YOHE SUPPLY CO.
P.O. Box 708 **Canton 1, Ohio**

Encircle No. 410 on Card, Opposite Page 65



National Broach Red Ring automatic gaging and sorting unit.

matic gaging and sorting machine for checking and sorting small pinions for tooth size. Unit is used in connection with gear production machine.

NATIONAL FLUID POWER ASSOC.
Evanston, Ill.

Booth No. 238

Personnel: Barrett Rogers, exec. secy. As a trade association representing the fluid power component industry, they will not be showing any products, as many of their members will have their own displays. The booth will be used primarily as a source of information on fluid power subjects.

NATIONAL PNEUMATIC CO., INC.
Boston, Mass.

Booth No. 244

Personnel: C. W. Ledig; R. A. Broten; P. E. Morgan.
New Products: "Power Package" permits the combination of the Power Drive cylinder and the Power Check by means of the new systems mounting kit. This arrangement offers the speed and economy of air with the control of hydraulics without hydraulic pumps, hydraulic valves and electric motors.
Other Products: Power Drive cylinders (pneumatic-hydraulic); Power Check (hydraulic regulator); Power Feed kits; PowerTrol valves.

NEILL & CO., LTD., JAMES
New York, N.Y.

Booth No. 797

Personnel: G. W. Ward, sales mgr., Sheffield, England; J. Murray, H. B. Flanagan, Chicago rep.
New Products: Eclipse magnetic holder and magnetic adjustable link; Eclipse toolbit holders.
Other Products: Magnetic tools; perma-

DoALL Air Hardening
Precision Tool and Die Steel
(Ground Flat Stock)

- Wears up to 50% longer than oil hardening steel
- Contains chrome, molybdenum, vanadium
- Ask about new DoALL "SPRAY-ON" steel ink for layouts



Call DoALL — Consult classified phone directory for the DoALL Sales-Service Store nearest you

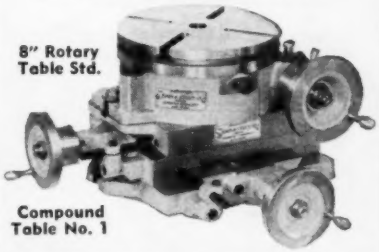
The DoALL Co.
Des Plaines, Ill.

For longer wearing tools and dies . . . Just ink it, mark it and saw it.

Air and oil hardening . . . over 1000 sizes.

Encircle No. 411 on Card, Opposite Page 65

The STEVENS Line
SINCE 1925
Introducing NEW series



ROTARY TABLES, 5-7½-8-12-15-18-24" sizes both standard & dial indexing types
ADJUSTABLE TILTING TABLES, #0 - - 2
COMPONUD TABLES, #1 - 2
ROTARY-COMPOUND TABLES, #1 - 1½ - 2
INDEX CENTERS - multiple spindle
ROTARY-COMPOUND TABLES, #1 - 1½ - 2

See your dealer or write for bulletins

The JOHN B. STEVENS Company
SOMERSVILLE, CONN.

Encircle No. 412 on Card, Opposite Page 65

SPRING LOADED LIVE CENTER



Eliminate excessive overhang of your center. Use the accurate, rugged, reliable *NIROL. The spring loaded Live Center that compensates for expansion and contraction in actual operation.

Write for complete information.

*Reg. U.S. Pat. Off.



***NIROL** MANUFACTURING COMPANY

900 H'WAY 22, N. PLAINFIELD, N. J.

Encircle No. 413 on Card, Opposite Page 65



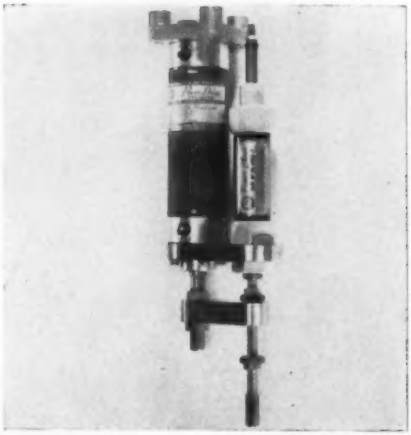
LASSY TAPPERS

Set new standards for cut thread accuracy. Are universally used in the Tool Room and for small lot production. No set up. Always ready for instant use.

Write for illustrated circular showing all models

LASSY TOOL CO. Plainville, Conn.

Encircle No. 414 on Card, Opposite Page 65



National Pneumatic Power Package.

nent magnets; hacksaw blades and frames; toolbits and engineers' tools.

KARL A. NEISE
New York, N.Y.
Booth No. 162

NELCO TOOL COMPANY, INC.
Manchester, Conn.
Booth No. 778

NELSON STUD WELDING, DIV. GREGORY INDUSTRIES, INC.
Lorain, O.
Booth No. 628

Personnel: L. C. Barr; R. C. Friedly; R. C. Singleton; Harold Bartley; Donald Duffey; Norman Fletcher; L. C. Hansen; George Kauss; Herbert Scott; R. W. Murdock.
New Products: NS-9 stud welding gun; Nelwelder "2000" power unit.
Other Products: Welded samples showing various cost-saving applications of end welded studs.

NEW ENGLAND TOOL & MACHINE
Berlin, Conn.
Booth No. 461
Personnel: Paul Campbell

NEW HERMES ENGRAVING MACHINE CORP.
New York, N.Y.
Booth No. 166
Personnel: W. C. Kamin; Ed Griggs; M. Kaufman; Mr. Greuttner.
New Products: Tracer guided electric arc etching equipment for rapid marking of hardened steel, its alloys, brass, aluminum, and copper.
Other Products: Portable and bench type Pantograph engraving machines; dials; name plates.

NEW YORK BELTING & PACKING
New York, N.Y.
Booth No. 1307



Nelson stud welding gun, NS9.

NICHOLS-MORRIS CORP.
White Plains, N.Y.
Booth No. 351

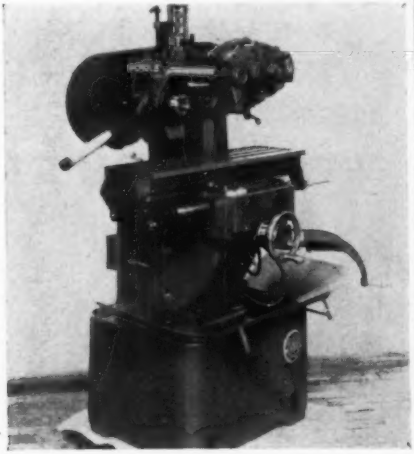
Personnel: W. Hart Nichols; R. E. Morris; Norman Smith; S. K. Bigelow.
New Products: No. 8-SA Nichols semi-automatic miller; Nichols twin mill.
Other Products: Nichols standard miller, tool room miller; semi-automatic miller, model 6-SA; Ellis double swivel dividing head; Nichols miller accessories.

NICHOLSON FILE CO.
Providence, R.I.
Booth No. 157

Personnel: E. A. Fuller; R. J. Gibb; G. W. Hughes; H. D. VanDemark; E. W. Brown; Harry Goodale.
New Products: Files for sharpening special metals, i.e. aluminum, brass, bronze, cast iron, tool steel, stainless steel; rotary power files and burs.

E. V. NIELSEN, INC.
Stamford, Conn.
Booth No. 208

Nichols-Morris semi-automatic miller.



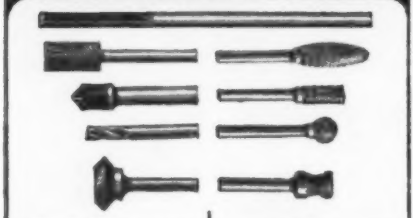


Encircle No. 415 on Card, Opposite Page 65



Encircle No. 416 on Card, Opposite Page 65

ESSEX *Precision* CARBIDE & HIGH SPEED CUTTING TOOLS



CARBIDE TOOLS:
Burrs
End Mills
Reamers
Burr Sets
Special Tools

HIGH SPEED STEEL TOOLS:
Rotary Burrs
Rotary Files
Chatterless Countersinks
Special Tools

All U.S. Steel & Carbide Tools salvaged and resharpened (Write for catalogue)

ESSEX ROTARY FILE & TOOL CORP.
Makers of Fine Tools Since 1868
295 MADISON AVE. NEW YORK 17, N. Y.

Encircle No. 417 on Card, Opposite Page 65

JACO LOW COST AUTOMATIC

STOCK REEL
COSTS NO MORE THAN STANDARD STOCK REELS

POWERED BY THE NATURAL SPRING OF UNCOILING STOCK



3 SIZES – ALL WILL TAKE 6" WIDE STOCK.
24" diameter $85.00
30" diameter $89.00
36" diameter $95.00

Guaranteed – money back if not 100% satisfied

New LOW prices on the JACO 3-inch and 6-inch SCRAP CHOPPER



WRITE FOR FULL DETAILS TODAY!

Dealer Inquiries Invited

JACO DEVICES, INC.
99 HIGH ST., HINGHAM, MASS.

Encircle No. 418 on Card, Opposite Page 65

NILSSON GAGE COMPANY, INC.
Poughkeepsie, N.Y.
Booth No. 717

NOBLE & WESTBROOK MFG. CO., THE
East Hartford, Conn.
Booth No. 767

New Products: Model 442 dial type marking machine that roll-marks permanent sunken impressions into thin wall tubes or sleeves on a production basis. This model has a continuous rotating mandrel carrier dial, adjustable die holder head, and automatic unloading. A new safety circuit stops the machine in the event of improperly loaded parts, either from the chute or by an operator, and protects the operator who inadvertently gets too close to the die holder head. Infinitely variable speed drive can be set to suit production requirements, up to 100 pieces per minute.
Other Products: Noblewest Series 50 general purpose marking machines; other dial marking and general purpose machines; bench type roll-marking machines; Stampmaster hand number device; automatic numbering heads; steel marking dies; Nobility hand typeholder.

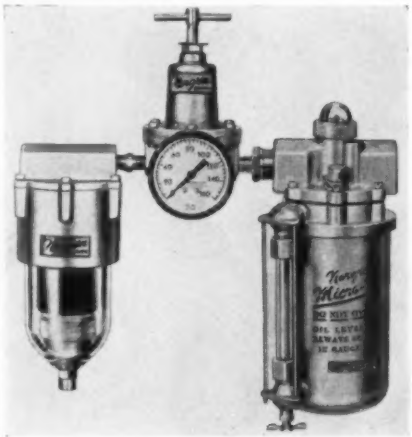
NOPAK DIVISION, GALLAND-HENNING MFG. CO.
Milwaukee, Wis.
Booth No. 328

New Products: Line of square head, Class 3 cylinders for oil hydraulic service at pressures to 1000 psi.
Other Products: Complete line of valves and cylinders, both air and hydraulic, will be exhibited. Working models will demonstrate how Nopak components are used for the application and control of fluid power.

NORGREN CO., C. A.
Englewood, Colo.
Booth No. 325

Personnel: D. G. Faust, vice-pres., sales

Norgren Micro-Fog.



and advertising; W. O. Hall, chief field eng.; D. G. Robb, field eng.; Frank Goll, asst. sales mgr.

New Products: 200 and 300 bearing inch lubricators; 1000 bearing inch lubrocontrol unit. A feature of the exhibit will be a turret lathe in operation, equipped with a 200 bearing inch Micro-Fog lubrication unit lubricating machine components, and also equipped with a Spray-Lube system for the application of cutting oils.

Other Products: ¾" and 1" automatic-drain filters and others.

NORTHWESTERN TOOL & ENGINEERING CO.
Dayton, O.

Booth No. 301

New catalog No. 23 will be distributed at the booth. It contains illustrations of a complete range of clamping and hold-down tools for ⅜" bolt sizes up to and including 1" bolts.

NUPLA MANUFACTURING CO. NEW PLASTIC CORPORATION
Los Angeles, Calif.

Booth No. 398

O. K. TOOL CO., INC., THE
Milford, N.H.

Booth No. 633

Personnel: Thurston Williams; R. S. Young; R. W. Greywacz; L. C. Gaunt; Carl Warren; Robert Strandahl; Richard Gartner; Frank Gaynor; David Bristol; L. F. Rogers; Jack Caswell; Donald Dalton; E. T. Plummer.

New Products: Inserted blade cutters; multiple operation tools; single point tooling.

OAKITE PRODUCTS, INC.
New York, N.Y.

Booth No. 1325

Personnel: F. J. McNally, mgr. Chicago div.; A. A. Becker, Jack Becker, K. J. Birdwell, E. H. Olson, T. A. Sailor, service rep.

New Products: Rustripper alkaline compound that removes rust, oxide scale, paint and shop soils without changing dimensions of precision parts or causing hydrogen embrittlement. May be used in hot or cold water solutions, with or without current and with or without cyanide.

Other Products: Soluble oil for machining, grinding, cutting; special drawing compound and composition No. 12 for drawing and forming; alkaline, solvent, and acidic detergents for production and maintenance cleaning.

TINIUS OLSEN TESTING MACH.
Willow Grove, Pa.

Booth No. 566

O'NEIL-IRWIN MFG. CO.
Lake City, Minn

Booth No. 1000

New Products: No. 18-48 hydraulically operated 12 ton press brake with 48" length of bed and ram; and a profile bending machine with a special pneumatic floating nose.

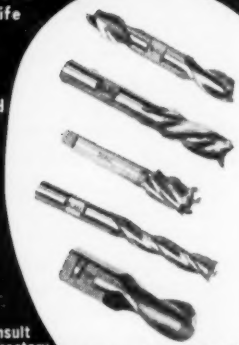
Other Products: Di-Acro brakes; rollers; shears; punch presses; notchers; rod parters; and spring winders.

DoALL

H. S. STEEL END MILLS

Hollow ground spiral flutes afford better chip removal and increase tool life

- Double and Single End Styles
- Straight and Tapered Shanks
- Straight, Corner Rounding and Ball Ends
- Sizes 1/16" to 2"



Call DoALL—consult classified phone directory for DoALL Service-Store that stocks gages, cutting tools, supplies,— *or write*

The DoALL Co.
Des Plaines, Ill 20

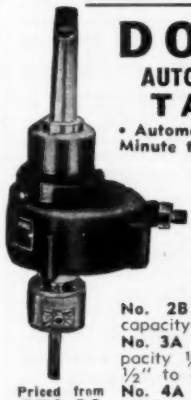
DoALL has Carbide End Mills, too!

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DORMAN

AUTOMATIC REVERSE TAPPERS

- Automatic Torque Control, One Minute to Adjust, Prevents Tap Breakage, Operator Need Not Be Skilled.
- WIDE RANGE TAP CAPACITY.



No. 1A FRICTION DRIVE TAPPER — capacity No. 2-56 to ⅜" in Steel—½" in Aluminum.

No. 2B POSITIVE TAPPER — capacity ⅜" to ⅞" in Steel.

No. 3A POSITIVE TAPPER—capacity ½" to 1¼" in Steel—½" to ¾" Pipe Taps.

No. 4A TAPPER—capacity ¾" to 2" in Steel including Pipe Taps.

- PRODUCTION THREADERS with Round Split . . . Button . . . Acorn Dies.

Priced from **$50.00** Write for Bulletin IMMEDIATE DELIVERY

THRIFTMASTER PRODUCTS CORPORATION
Division of Thomson Industries, Inc.
1038 N. PLUM STREET, LANCASTER, PA.
STANDARD UNIVERSAL ADJUSTABLE AND SPECIAL HEAD CENTER DRILLHEADS

Encircle No. 420 on Card, Opposite Page 65

AT AN ANGLE — IT FILES



USED STRAIGHT — IT FINISHES



the ReciproLiter*

- Rotates and Reciprocates
- Non-Scratching movement
- 1 to 15,000 R.P.M. — stroke 0 to 3/8"
- Files, hones, saws, laps, polishes, chafes, grinds, mills, engraves, etc.

it's the new "3-WAY" tool to make the tool, die and mold maker's job easier —

WRITE FOR BROCHURE and PRICES

Nord Corporation
16 SPRUCE STREET
NUTLEY, NEW JERSEY

*Trade Name
All Patents Pending

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Dies Last Longer . . . Stop Sticking When You Use World-Famous

MOTOR MICA

TRADE MARK REG. U. S. PAT. OFF.

ANTI-FRICTION COMPOUND
In White Powdered Form



Prolongs life of dies. Eliminates sticking. Dies operate smoother. Reduces friction. Saves wear on moving parts.

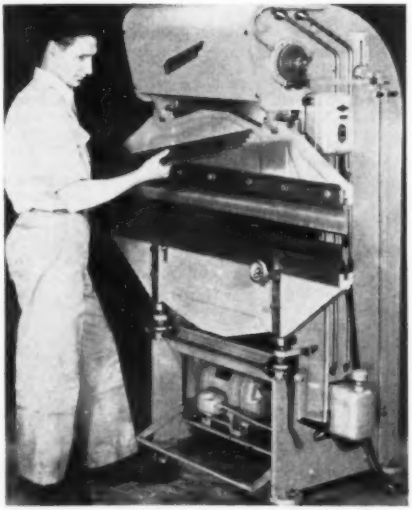
Works wonders when used with cutting oils. Simplifies deep drawing, metal stamping, milling, etc. Punch press departments cannct afford to be without Motor-Mica. It will solve your toughest Lubrication problem. Try it today.

Keeping the wheels of industry cool since 1914

Write For Free Sample

SCIENTIFIC LUBRICANTS CO.
3469 N. Clark St. Chicago 13, Ill.

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O'Neil-Irwin 12 ton hydraulic press brake.

OPTICAL GAGING PRODUCTS, INC.
Rochester, N.Y.
Booth No. 917

ORBAN CO., INC., KURT
Jersey City, N.J.
Booth No. 305

Personnel: Kurt Orban; Erich Gobien; Doug Stadelbauer; George Vonderahe; Heinz Boehm; Matt Hubchen; Kurt Ucko; Harry Andress; R. C. Zeile.
New Products: Lindner optical jig borer; Hurth automatic milling machine; S&F gear testers; Pegard boring and milling machines.
Other Products: Trebel dynamic balancer; Scheiss vertical turret lathe.

ORTMAN-MILLER MACHINE CO.
Hammond, Ind.
Booth No. 314

OSBORN MFG. CO.
Cleveland, O.
Booth No. 466

Personnel: E. A. Sisson, sales mgr.; H. L. Burton, asst. sales mgr.; A. J. Chandler, mgr. industrial sales; R. O. Peterson, mgr. technical dept.; R. S. Cadman, Chicago area mgr.
New Products: Recent developments in power brushing and the new Brushmatic 3A machine will be shown along with the Brushmatic 301 series.

OZALID, A DIVISION, GENERAL ANILINE & FILM CORP.
Johnson City, N.Y.
Booth No. 1040



Osborn's Brushmatic 3A machine.

PALMGREN STEEL PRODUCTS, CHICAGO TOOL AND ENGINEERING CO.
Chicago, Ill.

Booth No. 262

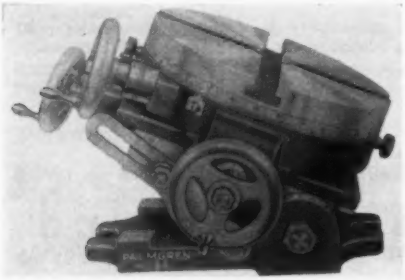
Personnel: C. A. Palmgren; G. L. Parsons; F. M. Hayes; Fred Shoemaker; H. F. Hofmann; M. Erickson.
New Products: No. 84 Palmgren rotary table; No. 23B-3" Palmgren angle vise; No. 40B-4" Palmgren Swivel machine vise; No. 74-4" Palmgren air vise; No. 94-4 Palmgren lever lock vise; No. 100 Palmgren bench mill; No. 55-2½" Palmgren three-way angle vise; 3", 4", 6", 8" Palmgren swivel production vises.
Other Products: Complete lines of Palmgren drill press vises, angle vises, swivel machine vises, production vises, rotary tables, angle plates, milling attachments.

PANGBORN CORP.
Hagerstown, Md.

Booth No. 749

Personnel: V. F. Stine, vice-pres.; A. J.

Palmgren No. 84 rotary tilting indexing machine.



Toolmaker's Microscope
Made by Bausch & Lomb..
Sold by DoALL

for Examination and Measurement in the shop, in the lab

- Speeds work
- Reduces error
- Unreversed image
- Cannot damage delicate parts





Call DoALL — consult yellow directory for nearest DoALL Service-Store that stocks cutting tools, gages, supplies—or *Write*

The DoALL Co.
Des Plaines, Ill.

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Boyar-Schultz
COPPER HEAD LAPS
(STANDARD and EXPANSION)

It is less costly and quicker to use Boyar-Schultz Copper Head Laps, than to make your own. Copper Head Laps are accurate and rapid to use. Nothing to wear out but the copper sleeve which is replaceable and adjustable to the correct size. Adjustment permits maintaining lapping size till worn out and replaced with new ones. Available from stock in standard sizes, ⅛" to 2½" diameters.

SPECIAL TOOL MAKERS BENCH LAP SET
Consists of seven most commonly used sizes — ⅛"-3/16" ¼" - 5/16" - ⅜" 7/16" - ½", with enameled die cast base.



BOYAR-SCHULTZ CORPORATION
2008 S. 25th Ave., Dept. F-B, Broadview, Ill.
Encircle No. 424 on Card, Opposite Page 65



Encircle No. 425 on Card, Opposite Page 65

Buckley, sales mgr.; A. L. Gardner, adv. mgr.; L. W. Wagner, Chicago district mgr.; R. W. Gossard; A. L. Milke, Chicago sales eng.; D. R. Bair, Detroit district mgr.; B. R. Artz, Syracuse district mgr.

New Products: Type E-Z-3 Hydro-Finish wet blast cleaning cabinet; tower type wet dust collector.

Other Products: Blastmaster cleaning barrel; self-cleaning type cloth screen dust collector

PATTERSON MACHINE CO.
Cleveland, O.

Booth No. 1812

Personnel: G. C. Patterson

PEASE CO., C. F.



Par-A-Matic drill.

Chicago, Ill.

Booth No. 118

Personnel: A. F. Jacobs

PEDRICK TOOL & MACHINE CO.
Philadelphia, Pa.

Booth No. 356

Personnel: G. H. Metz Jr., vice-pres.-gen. mgr.; R. M. Shaw Jr., pres.

New Products: Pedrimatic double end bender.

Other Products: Standard bending machine.

ATELIERS MARCEL PEGARD
Andenne, Belgium

Booth No. 317

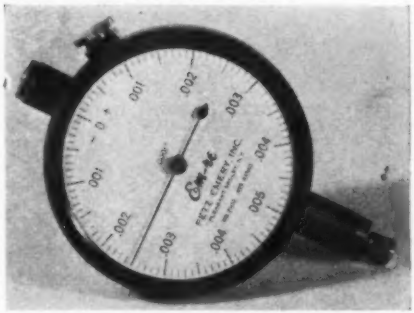
Personnel: Mr. Gonze, administrator; Mr. Fecheyr, sales mgr.; Mr. De Wandeler, technician.

New Products: Jig boring and milling machine A.F. 3; floor type boring machine, spindle diameter 100 mm.

PELLOW MACHINE COMPANY
Detroit, Mich.

Booth No. 367

Em-re dial indicator, Petz-Emery Inc.





When you think of small END MILLS — think of MICRO MINIATURES

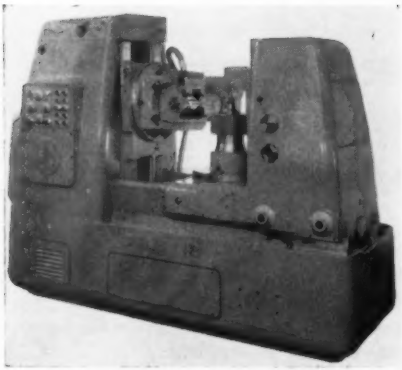
We are using this opportunity to express gratitude for your acceptance of Micro Miniature End Mills over the past decade. Woodson Tool Co. pioneered the manufacture of very small end mills using "ground-from-the-solid-after-heat-treatment" methods.

In the decade since then Micro Miniatures gained a reputation for outstanding quality.

We intend to maintain and build our reputation further in the years to come.

WOODSON TOOL CO.
4811 LENNOX BLVD. INGLEWOOD, CALIFORNIA

Encircle No. 426 on Card, Opposite Page 65



Pfauter Model P500 gear hobbing machine.

PERFEX GAGE & TOOL
Mt. Clemens, Mich.

Booth No. 1818

Personnel: A. B. Ferriss

PERRY EQUIPMENT COMPANY
Erie, Pa.

Booth No. 1210

PETZ-EMERY, INC.
Pleasant Valley, N.Y.

Booth No. 910

New Products: Line of Em-re dial indicators. They are shockproof, have jeweled movements, high sensitivity, simple design, rugged construction. Entire line is built around just 31 parts; all but six of these are common to all models.

PFAUTER MACHINE CO.
Riverdale, N.Y.

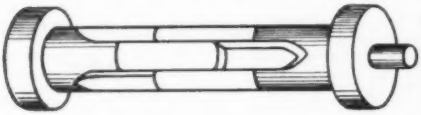
Booth No. 336

Personnel: Dr. Michael Pfauter, pres.; W. P. Kahn, vice-pres.; H. Demuth, mgr., service dept.; A. Klein.

New Products: Type P500 gear hobbing machine featuring diagonal hobbing, developed to preserve tool life at high speeds. Universal hob head for both longitudinal and tangential hobbing eliminates special hob shifting attachments.

Other Products: Type RS9 high speed spline hobber.

Sketch of Porter Precision Bal-Lok tools.



Get More Holes With DoALL Jobber Drills

Only DoALL has XL Drills (No. 60 through 1/4")

- Ground from solid
- Special surface treated edges
- Bright polished flutes
- Last longer, stay sharper
- More holes per grind

- ***General Purpose*** —for short runs or production
- ***Heavy-duty Split Point***—for stainless and other heavy duty work
- ***"Hy" Helix***—for deep holes in aluminum and other light materials
- 17/64" through 1/2" are milled

Call DoALL —see classified directory for nearest DoALL Service-Store, *or write:*

The DoALL Co.
Des Plaines, Illinois

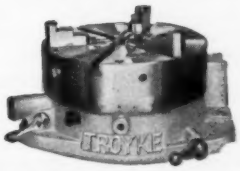
43

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TROYKE

ROTO-INDEXER

Indexing
Rapid
•
Positive
•
Accurate



CHUCK OR T-SLOTTED INDEXING TABLES - FOUR MODELS

Hand operated. Unique patented block out arrangement. Can be used in vertical or horizontal position.

WRITE FOR CATALOG No. 20

TROYKE MFG. CO.
CINCINNATI 9, OHIO

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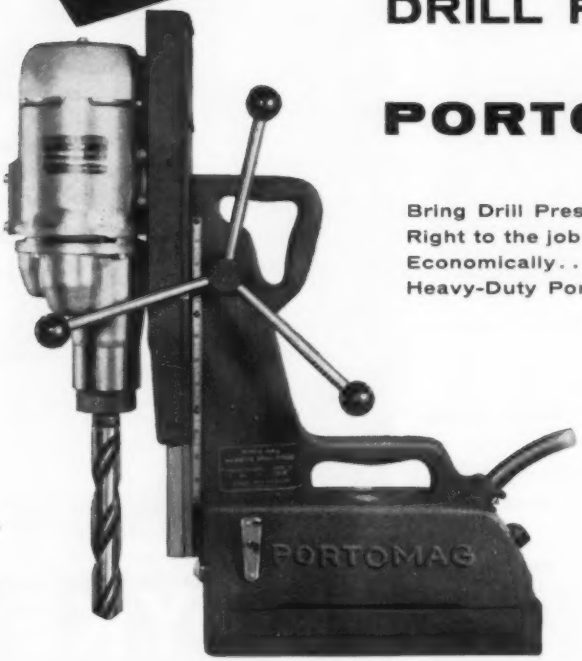
NEW!

Portable *electro-magnetic*

DRILL PRESS

PORTOMAG

Bring Drill Press Accuracy
Right to the job Easily, Safely,
Economically . . . with the new
Heavy-Duty Portomag





This rugged and dependable electro-magnetic power unit has been developed to make difficult and costly drilling, tapping, and reaming operations simple and economical.

Its heavy duty electro-magnetic base makes it possible to affix power drill right to the surface of a job. For operating accuracy, regardless of working position, the burden of weight is completely spared the operator.

Special features of this unique power tool include: an electro-magnetic power control switch for easy operation, heavy duty power capacity for positive positioning, de-magnetizing switch for immediate removal from work, and an optional reversing switch for tapping operations.



WRITE NOW FOR FREE INFORMATION

Portomag, Inc.

1511 E. NINE MILE ROAD
FERNDALE 20, MICH.
LINCOLN 7-0055
DEPT. 22

Encircle No. 429 on Card, Opposite Page 65

PINES ENGINEERING CO., INC.
Aurora, Ill.

Booth No. 197

New Products: Bar-type bender, for rapid bending of such workpieces as concrete reinforcing bars, stirrup bars, and tie bars, as well as for forming smooth rounds, squares, and deformed bar stock of all types; six-ton tube bending press, designed to increase production of U bends not requiring a mandrel. Tubing up to 1⅛" o.d. can be formed to a 3" or larger radius. The machine is similar in design to the 20-ton tube and pipe bending press featuring a vertical-actuated ram and horizontal-type wing dies.

PIONEER PUMP DIV., DETROIT HARVESTER CO.
Detroit, Mich.

Booth No. 1406

Personnel: J. J. Bryan; W. H. Frost; H. G. Edwards; Frank Schneider; N. H. Fuller; H. W. Ryno; Glenn Bound; F. R. Griffith; James Rivest; Wm. Gard.
New Products: Low suction coolant pumps.
Other Products: Complete line of coolant and lubricant pumps; coolant tank units.

PIONEER TOOL ENGINEERING, INC.
El Segundo, Calif.

Booth No. 1235

PORTAGE DOUBLE QUICK TOOL CO.
Akron, 11, Ohio

Booth No. 669

Personnel: W. Novkov, sales mgr.; O. Morgan, sales, Stanley Cimarik, eng.
New Products: "Interapid" groove checking gages, "Sure-Bore" micrometer adjustable boring bar cartridges.
Other Products: Quick change tools, carbide cutoff tools.

PORTER PRECISION PRODUCTS
Cincinnati, O.

Booth No. 216

Personnel: W. G. Porter, pres.; Hazel Porter, treas.; Dan Lionette, sales mgr.; L. W. Dodd, asst. sales mgr.; Robert Hoffman, gen, mgr.; Ben Wickemeier, sup.; E. E. Ader, asst. to pres.; Emil Krueger, regional sales mgr.
New Products: Bal-Lok punches; intermeshing sleeves; cone leaders; shaped die buttons. Bal-Lok tools, made from 1.50% carbon and high speed steel, are interchangeable; retainers employ ball block principle.
Other Products: AC units; standard head type punches; standard press fit die buttons.

PORTOMAG SALES, INC.
Ferndale, Mich.

Booth No. 288

PRECISE PRODUCTS CO.
Racine, Wis.

Booth No. 256

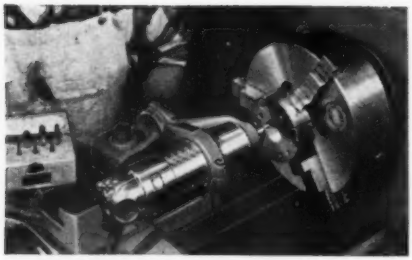
Personnel: R. Schumann, pres.; H. W. Schumann, exec. v.p.; W. V. Sminkey, sales mgr.; M. E. Salstrand, sales.
New Products: Precise power quills—Model 60 (45,000 rpm, ½ hp) and Model



Encircle No. 430 on Card, Opposite Page 65



Encircle No. 431 on Card, Opposite Page 65



Precise Products power quill.

80 (25,000 rpm, 1½ hp) for use on precision lathes for milling. Bench type milling machine with electric table controls and rotary table. Also portable hardness tester.

Other Products: Rotary cutting tools for use in power quills. Machine tool mounts for power quills.

PRECISION DETROIT COMPANY
Detroit, Mich.

Booth No. 1230

PRECISION DIAMOND TOOL CO.
Elgin, Ill.

Booth No. 318

PRECISION GRINDING WHEEL CO.
Philadelphia, Pa.

Booth No. 267

PRECISION TOOL & MFG. CO.
Chicago, Ill.

Booth No. 806

PRECISION WELDER & FLEXOPRESS CORP.
Cincinnati, O.

Booths No. 725-727

Personnel: T. E. Jones, pres.; E. W. Forkner, vice-pres.; Ben Kuresman, vice-pres.; W. E. Klingeman, sales mgr.; R. R. MacDonald, sales eng.

New Products: Flexopress 75-ton straight side automatic high speed press featuring speed ratio of 85 to 250 strokes per minute. It utilizes antifriction slide mount, integrally constructed roll feed, producing automotive parts.

Other Products: Gear driven circular seam welder with intermittent drive for efficient roll-stop-spot welding; press type spot welder with high production tooling or high speed stitch welding feature.

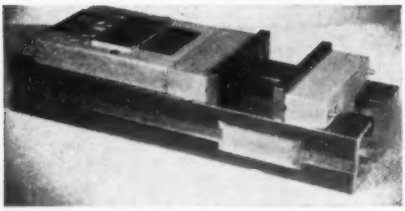
PRODUCTION DEVICES INC.
Whitehall, N.Y.

Booth No. 795

Personnel: Drayton C. Zipp, pres.; A. L. Dery, O. W. Mandell, R. W. Clynes, E. A. Davenport, E. V. Schuerer, Andrew Wands, Stephan Feilinger, Paul Neuses, sales.

New Products: Airlox power-head; Airlox Model S-30 pneumatic vise, now equipped with pressure grease system in the movable jaw.

Other Products: Airlox pneumatic vises.



Airlox Model S-30 pneumatic vise, Production Devices Inc.

PRODUCTION MACHINE CO.
Greenfield, Mass.

Booth No. 625

New Products: Type 486 centerless grinding and finishing machine, for light applications—will handle bar stock up to 1" dia., tubing up to 3" dia., any length, within the weight limitations of the machine; twin belt surfacer, which grinds, sands, surface-polishes, deburrs—two operations in a single pass. Platens in back of the belts are adjustable for parallel or angular surfaces; one or both heads are adjustable for work thickness. Each head is driven by a 1200 rpm motor, developing a belt speed of 3500 sfpm.

PRODUCTO MACHINE CO.
Bridgeport, Conn.

Booth No. 396

New Products: Guide pins; bushings. Guide pins have been improved with greater press fit lengths, smoother end radii and surface finish of 7-9 microinches. Master bushings have these new design features: new standards for relief which give greater bearing surfaces and improve accuracy; ground shoulders, which seat bushings square to punch

Producto master bushing.





Rahn calibration kit.

holder for perfect alignment; ground lead on press fit, which starts bushing into punch holder easily; double figure 8 oil grooves, fed by grease fitting to provide constant source of lubrication to pin and bushing; tumble-blasting of all unground surfaces.
Other Products: Complete line of die sets, diemakers' accessories, vises, feeding devices, and other toolroom equipment.

PUNCH PRODUCTS CORPORATION
Niagara Falls, N.Y.
Booth No. 191

PUTNAM TOOL COMPANY
Detroit, Mich.
Booth No. 105

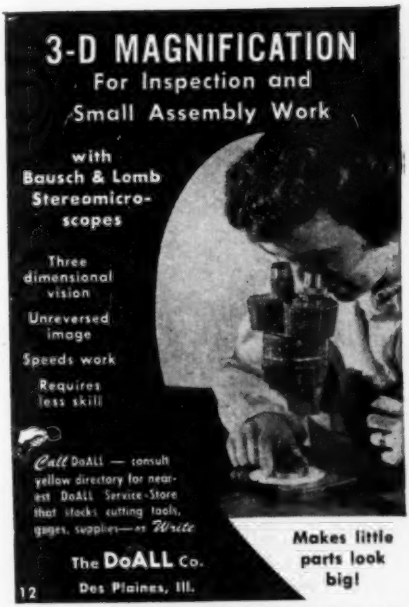
R AND L TOOLS
Philadelphia, Pa.
Booth No. 741

RACINE HYDRAULICS & MACH'Y
Racine, Wis.
Booth No. 229

RAHN GRANITE SURFACE PLATE CO.
Dayton, O.
Booth No. 928
Personnel: R. J. Rahn; Ivan J. Rahn; A. D. Ohrman.
New Products: Device for calibrating surface plates. A 24"x36" surface plate can be completely calibrated in 45 minutes. No calculations are required. The entire calibration consists of merely taking indicator readings under a straight edge, adjustably mounted, so that it can always be supported in the exact reference plane.
Other Products: Granite surface plates; angle plates, parallels, straight edges.

RAYBESTOS MANHATTAN, INC.
MANHATTAN RUBBER DIVISION
Passaic, N.J.
Booth No. 161

READY TOOL CO.
Bridgeport, Conn.
Booth No. 1713
Personnel: C. B. Christensen



Encircle No. 432 on Card, Opposite Page 65



Encircle No. 433 on Card, Opposite Page 65

J. E. REINERTSON & CO.
Chicago 44, Ill.

Booth No. 240

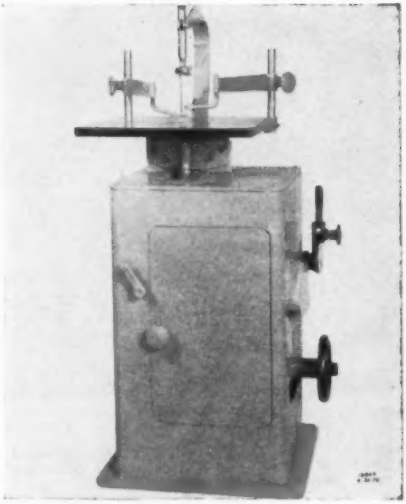
Personnel: J. R. Reinertson, gen. mgr.; J. A. Rieker, sales mgr.; K. Cushing, sales promotion mgr.; E. Morgan; E. Stelter; J. Pavlic; E. Van Guilder; J. Rush; J. Theurer; R. Platt.

New Products: Special 2-ton punch press designed for Toolset self-contained punching units with interchangeable punches and dies for flexible tooling in short run operations; variable angle drill grinder; liquid controls for Misticmist units; True-Check drill gage; taper-micrometer.

Other Products: Pivot punches, Sculpmetal and Cold-mold; drill chucks; centers; pencil grinders (100,000 rpm).



Encircle No. 434 on Card, Opposite Page 65



Rice floor type die filer.

RELIANT GAGE & SUPPLY
South Gate, Calif.

Booth No. 1010

Personnel: W. J. Kassen, pres.; R. W. Stevenson, secy.-treas.; L. E. Biggie, gen. sales mgr.

New Products: Depth gage; snap gage; O ring gage.

Other Products: Bore gages; deep hole gages; snap ring groove gages; test indicators; gage blocks; thread and gear measuring wires; bench comparators; light wave equipment; bench centers; granite surface plates; height gages; vernier calipers; master setting rings; tooling balls.

REZOLIN, INC.
Los Angeles, Calif.

Booth No. 388

Personnel: L. R. Miller, pres.; L. J. Oye, sales mgr.; A. W. Dames, Western div. mgr.; George Flett, Eastern div. mgr.;

LASSY **WORK HOLDERS**



As Drill Jig—or for holding work for Reaming or Tapping operations.

Quick, accurate setups on lathes, jig borers, milling machines, grinders and drill presses. Normalized and accurate to .0005 in 3 inches. Hold round or odd shapes. Quick acting cam-lock swing clamp for fast loading, positive holding.

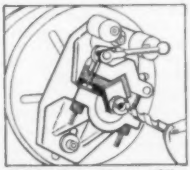
Complete line of standard accessories includes jaws and clamps for multiple holding and also for use as drill jig.

Made in 4 models—capacity to 4 inches.

Write for complete descriptive literature

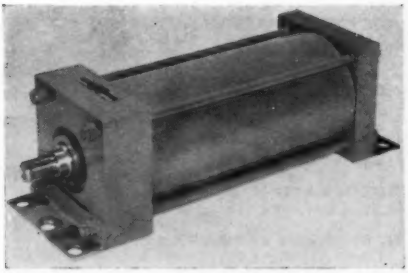
LASSY TOOL CO. Plainville, Conn.

Makers of Lassy Tappers



Production setups with repetitive accuracy

Encircle No. 435 on Card, Opposite Page 65



Rivett low pressure cylinder.

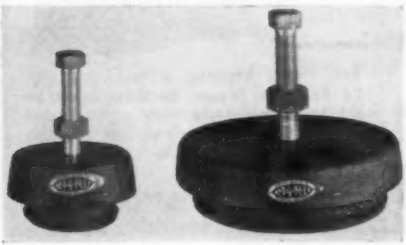
Appy Juras, Midwestern div. mgr.; Hubert Nelke, Southwest div. mgr.
New Products: L-904 and L-914 brilliant white laminating epoxies; L-940 flexible epoxy; tools, jigs, fixtures, and models fabricated of Rezolin Toolplastik.

RICE PUMP & MACHINE CO.
Belgium, Wis.
Booth No. 264
Personnel: R. D. Houghton; J. W. Spetz; C. R. Hoofnagle; H. A. Zindler.
New Products: Floor type die-filer, which saws and files to the center of a 26" circle and provides 6" clearance beneath overarm. Tilting powered arbor, permits operator to work on a level table. This table may be tilted when necessary, such as when sawing and filing compound angles. Variable speeds from 80 to 350 strokes per minute; variable strokes from 0 to 5", in infinite variations.
Other Products: Two-speed die filer; four-speed die filer; profile grinder; pedestal-mounted die filer.

RICHARD BROTHERS PUNCH DIV. ALLIED PRODUCTS CORP.
Detroit, Mich.
Booth No. 478

RICHARDS CO., J. A.
Kalamazoo, Mich.
Booth No. 721
Personnel: P. A. Richards; George Freemire; J. A. Richards, Jr.
New Products: Multiform benders.

Robinson Aviation W339 Adjust-O-Mount for punch presses.





Encircle No. 436 on Card, Opposite Page 65



Encircle No. 437 on Card, Opposite Page 65

RIVETT LATHE & GRINDER, INC.
Boston, Mass.
Booth No. 324

Personnel: A. B. Hunt, pres.; T. B. Williams, vice-pres.; J. A. Marsh, sales mgr.; R. T. Coffey, chief eng.; W. A. Kilbourn, production mgr.; R. C. Taisey, sales eng.; I. J. Stoutenburg, C. G. Brown, eng.; F. C. Corning, J. J. Burton, sales.
New Products: Line of low pressure cylinders. Cylinder is suitable for 150 psi air service and/or 500 psi hydraulic service. Features square steel cover, tie rod construction.

ROBBINS CO., OMER E.
Detroit, Mich.
Booth No. 416

ROBINSON AVIATION, INC.
Teterboro, N.J.
Booth No. 117

Personnel: C. S. Robinson, pres.; H. E. Nietscn, vice-pres. project development; R. A. Sprung, mgr., engr. service; A. G. Pendleton, field project engineer; J. J. Baxley, field project engineer; F. Dal Lago, project engineer; F. R. Mayer, application engineer.
New Products: Machine tool vibration, shock and noise attenuating mounts of all-metal construction. W339 Adjust-O-Mount for punch presses; 1133 sandwich-type shock mount for drop hammers; W227 plate-type, heavy duty, low frequency mount (air conditioning, pumps); W246 sandwich-type low frequency mount like W227 for heavier loads.
Other Products: W300 for shock and vibration of rotating machinery such as industrial and mobile engines; single and dual stage beam mounts; W164 for many industrial applications.

ROCKWELL MANUFACTURING CO. DELTA POWER TOOL DIV.
Pittsburgh, Pa.
Booth No. 1410

RODGERS HYDRAULIC INC.
Minneapolis, Minn.
Booth No. 126

ROSS OPERATING VALVE CO.
Detroit, Mich.
Booth No. 696

ROTO-MATION MOTORS, INC.
St. Clair, Mich.
Booth No. 724

H. B. ROUSE & COMPANY
Chicago, Illinois
Booth No. 1206

ROWE MACHINERY & MFG. CO.
Dallas, Tex.
Booth No. 921

ROYAL OAK TOOL & MACHINE CO.
Royal Oak, Mich.
Booth No. 278

RUDD-MELIKIAN DIST.
Chicago, Ill.
Booth No. 711

Personnel: R. W. Soper

RUSSELL, HOLBROOK & HENDERSON
New York, N.Y.
Booth No. 353

RYERSON & SON, JOS. T.
Chicago, Ill.
Booth No. 1400

THE S-P MANUFACTURING CO.
Cleveland, Ohio
Booth No. 257

S & S MACHINERY
Brooklyn, N.Y.
Booth No. 614

Personnel: Steve Allen

HOW TO GET A BETTER "SURFACE GRINDER" JOB EASIER!
USE THE QUICKEST AND EASIEST SETTING TOOLS ON THE MARKET
RADIUS DRESSER..$44.00 **ANGLE DRESSER..$49.00**

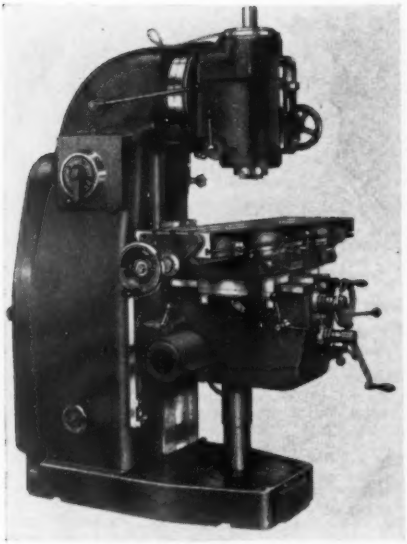


Chatter Resistant, Spring Loaded Spindle
Hardened shaft—bearing adjustable for wear.
Diamond always perfectly centered.
Easily set adjustable 180° stops.
10" Wheel size for DoALL and NORTON Grinders—$49.00. Diamond $7.00.
SPECIAL 20" Wheel Size $110.00.

Ball Thrust Bearing.
24 Precision Ground Surfaces. Can be set very accurately with a Protractor or Sine Bar. Works underneath the wheel. Large bearing surfaces.

The "Mighty Midget" Line
SPERMAN METAL SPECIALTIES • 2197 E. 21st ST. • BROOKLYN 29, N. Y

Encircle No. 438 on Card, Opposite Page 65



Sajo vertical miller Model VF-54, Austin Industrial Corp.

SALES SERVICE MACHINE TOOL
St. Paul, Minn.
Booth No. 393

SCHARMANN MACHINE CORP.
Pittsburgh, Pa.
Booth No. 1501

SCHAUER MFG. CO.
Cincinnati, O.
Booth No. 152

SCHMARJE TOOL & ENG.
Muscatine, Ia.
Booth No. 1815
Personnel: C. F. Schmarje

GEO. T. SCHMIDT, INC.
Chicago, Ill.
Booth No. 1311

SCHRADER'S SON DIV., A.
Brooklyn, N.Y.
Booth No. 525
Personnel: R. E. Olsen

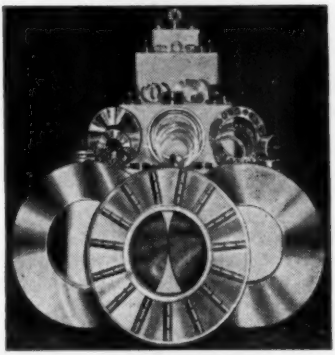
SCHRAMM INCORPORATED
West Chester, Pa.
Booth No. 600

SCOTT PAPER COMPANY
Chester, Pa.
Booth No. 228

SCULLY-JONES & CO.
Chicago, Ill.
Booth No. 488
Personnel: J. A. Scully; Dale Long; Len Skoglund; Dudley Lockrem; Bernie Better; Harry Conn; Joe Kosinski; Regner Ekstrom; John Brown; Gordon Cameron; Bernt Nordfjord; Bill Aytes; Roy Flones; John Lehde; Aldo Tognetti; Al Drantz; Sam Litrenti; Chet Hiera; Bill Skiba;



Encircle No. 439 on Card, Opposite Page 65



All kinds of
BALL & ROLLER THRUST BEARINGS
Flat . . . self aligning . . . double action . . . grooved . . . double direction. Can make bearings up to 25" diameter. Also equipped to repair and regrind bearings.
Immediate delivery on most bearings.
ACORN BEARING COMPANY
(Established 1917)
68 Stanley Street **New Britain, Conn.**

Encircle No. 440 on Card, Opposite Page 65

Ken Klare; Len Reid; Jim Sklenar; Roger Keough; Harry Galvin; Matt Marusarz.

New Products: Safe-Torque tap drivers—non-reversing and reversing types; Safe-Torque nut runners, to be demonstrated in air power tools showing speed and consistency of tightening nuts to a specified torque; Roll-Lock and Better-Hold chucking tools and pin arbors; recessing tools—slow motion demonstration to show operation and construction of tools for high production grooving operations; Scully-Drift—demonstrated by hand to show ease and speed of ejecting taper shank tools without damage to spindle, bearings and cutting tools; Toolitrol board and presetting tools—will show how at-the-machine problems of presetting, storing and changing tools in multiple spindles are coordinated to reduce setup time, down time and inspection time and keep machines running at near capacity; quick-change spindle attachment; lock-and-eject collet or chuck type tools; light gages.

Other Products: Tap and drill chucks; milling machine arbors and adapters; quick-change chucks; tap holders and drivers; counterbores, countersinks and core drills; adjustable adapters and spindle extension assemblies; sleeves and sockets; floating holders; centers; Flow-meters for liquid air and gas.

SHEPPARD, STANLEY
New York 7, N.Y.
Booth No. 415

Personnel: Stanley Sheppard, B. E. Cash, C. L. Medley, K. Watts.

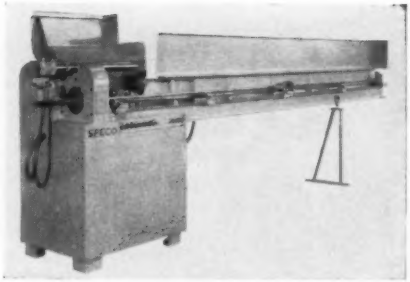
New Products: Harrison (British) 11" and 16" lathes; Harrison copy lathe, Adcock and Shipley (British) radial drilling machine, milling machines.

SEGAL MACH., EDWARD
New York, N.Y.
Booth No. 1813

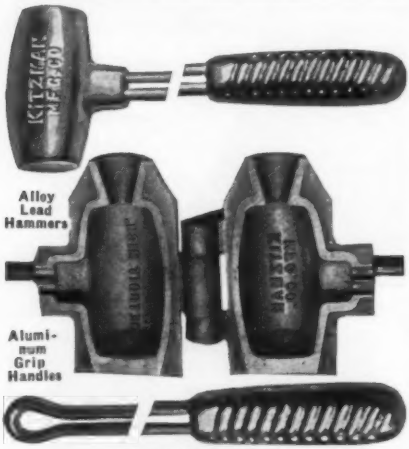
Personnel: Edward Segal

SEIBERT & SONS, INC.
Chenoa, Ill.
Booth No. 1500

SELAS CORP. OF AMERICA
Philadelphia, Pa.
Booth No. 1218



Steel Products' Brehm automatic tube cutter. (See Page 308.)



Hinged Hammer Moulds

1, 2½ and 5 lb. sizes—order your alloy lead hammer requirements from your machine tool supply house

or direct from:

KITZMAN MFG. CO.

15061 Hartwell Ave. Detroit 27, Mich.

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PALMGREN

for MILLING MACHINES, DRILL PRESSES, GRINDERS, SHAPERS...

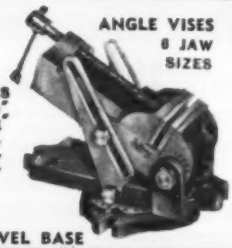
64 different models and types of vises, rotary tables, milling attachments, and other machine tool accessories.

Write for catalog No. 203

ANGLE VISES
8 JAW SIZES

SIZES
1½"
2½"
3"
4"
6"
8"

All with SWIVEL BASE



MILLING MACHINE VISES
No. 40B and 60B
4" and 6" Jaws with or without SWIVEL BASE



CHICAGO TOOL AND ENGINEERING CO., 8384 South Chicago Avenue, Chicago 17, Illinois

Encircle No. 442 on Card, Opposite Page 65

SENTRY CO., THE
Foxboro, Mass.
Booth No. 284

SERVICE DIAMOND TOOL CO.
Ferndale, Mich.
Booth No. 501

SERVICE MACHINE CO.
Chicago, Ill.
Booth No. 1506

SEVERANCE TOOL IND.
Saginaw, Mich.
Booth No. 289
Personnel: Dexter Hagaman

SHELDON MACHINE CO., INC.
Chicago, Ill.
Booth No. 1240

SHELL OIL COMPANY
New York, N.Y.
Booth No. 1306

SIEWEK TOOL COMPANY
Detroit, Mich.
Booth No. 1425

SIMONDS ABRASIVE COMPANY
SIMONDS SAW & STEEL CO.
Fitchburg, Mass. & Philadelphia, Pa.
Booth No. 1120

SIMPLEX MACHINE TOOL CORP.
Milwaukee, Wis.
Booth No. 1612
Personnel: L. J. Radermacher; P. E. Butzin; R. P. Bieszk; Charles Yaeger.
New Products: 2U two-way hydraulic feed precision boring machine with six No. 2 precision boring heads and hydraulically clamped work holding fixture designed to hold six pistons for semi-finish and finish boring of wrist pin holes. Operator loads one side while the other is boring.

SIZE CONTROL CO.
Chicago, Ill.
Booth No. 930

SKINNER CHUCK CO.
New Britain, Conn.
Booth No. 263

SOCONY MOBIL OIL CO., INC.
New York, N.Y.
Booth No. 279

SPIRAL STEP TOOL COMPANY
Chicago, Ill.
Booth No. 109

SPITFIRE TOOL CO.
Chicago, Ill.
Booth No. 736

THE STANDARD ELECTRICAL TOOL CO.
Cincinnati 4, O.
Booth No. 830
Products To Be Shown: Precision spindles of all types, including machine tool conversion units for boring mills, grinding machines, lathes, planers and other machines. Replacement spindles for all makes of machines. Work heads for machine tools.

STANDARD GAGE COMPANY
Poughkeepsie, N.Y.
Booth No. 1016

STANDARD PARTS COMPANY
Bedford, Ohio
Booth No. 1407



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KEO



STRAIGHT SHANK MACHINE COUNTERSINKS
•
HIGH SPEED STEEL
•
4 FLUTES

Cuts ½" to 1". Furnished with 60, 82 or 90 degree included angle. Specify desired degree of angle. Large stocks on hand.

Jobbers' Inquiries Invited

KEO CUTTERS
19326 Woodward · Detroit 3 Mich.

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STANDARD PRESSED STEEL CO.
Jenkintown, Pa.
Booth No. 479

STAR CUTTER CO.
Farmington, Mich.
Booth No. 1329

STARLITE INDUSTRIES, INC.
Philadelphia, Pa.
Booth No. 300

STARRETT CO., L. S.
Athol, Mass.
Booth No. 1116

STEEL PRODUCTS ENGINEERING CO., THE
Springfield, Ohio
Booth No. 660
Personnel: C. M. Brehm; W. E. Callison; J. F. Tehan; R. J. Houser; H. McCool; R. Kerr.
New Products: Brehm tube cutting machine, which cuts tubing in diameters from 3/8" to 2¼" with no burr, automatically. Over-all length 17 feet.
Other Products: Brehm "Shimmy" trimming die.

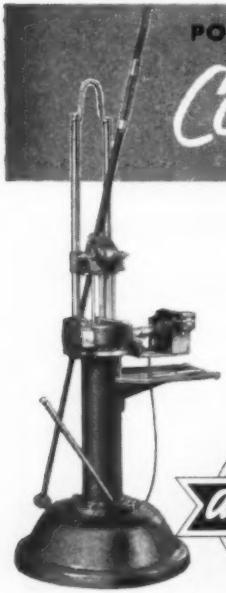
STONE CO., HERMAN
Dayton. O.
Booth No. 142
Personnel: C. L. Rears

STONE MACHINERY CO., INC.
Syracuse, N.Y.
Booth No. 755
Personnel: A. R. Stone; plant supt.; W. Postma, plant engr.; H. A. Kammerer, sales mgr.; J. B. Lennie, district mgr.; R. B. Carroll, district mgr.
New Products: Model M-16 non ferrous sawing machine, which features fully automatic feed for bar stock. Speeds of up to 1600 cuts per hour are attained, and work has a milled finish. Tolerances attained are less than .005".



Stone Model M-16 sawing machine.

POWER SCRAPER
Cuts Production Costs...
. . . 5 HOUR JOB CUT TO 50 MINUTES



One manufacturer was scraping flat pieces measuring 18 by 24 inches . . . each piece requiring 5 hours to scrape by hand. An Anderson Power Scraper cut scraping time to 50 minutes! That meant a substantial saving in production costs and another happy Anderson customer. Let us help you estimate how much this portable, easy-to-use power scraper will save for you.

Today, Write for Bulletin 11-5

Anderson
ANDERSON BROS. MFG. CO., Rockford, Ill.

Encircle No. 445 on Card, Opposite Page 65

Lengths up to 6 feet can be cut on standard model; larger capacities are available on request.
Other Products: Model M-35-A, Model SS-20-LR standard with 4 foot x 4 foot table, Model M-75 standard.

STUPAKOFF DIV., CARBORUNDUM CO.
Latrobe, Pa.
Booth No. 1309
Personnel: B. F. Bonaker

SUNNEN PRODUCTS CO.
St. Louis 17, Missouri
Booth No. 474
Personnel: Factory representatives.
Products To Be Shown: Precision honing machines and tools.

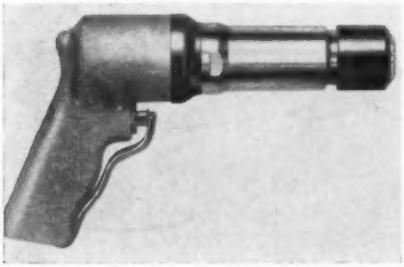
SUPER TOOL CO.
Detroit, Mich.
Booth No. 122
Personnel: Gordon Birgbauer, gen mgr.; Kenneth Fisher, sales mgr.; Milton Steffes, mkting. mgr.; Roy Matzen, Chicago rep.; Bernard Bretz, engineer; John Kenealy, sales; John Bennett, sales.
New Products: Core-vent masonry drill, improved type carbide tipped drills.
Other Products: Carbide-tipped and solid carbide tools, including milling cutters, drills, reamers, center bores, single point tools, boring tools, and lathe centers.

SUPERIOR HONE CORP.
Elkhart, Ind.
Booth No. 551
Personnel: A. F. Hasty; L. A. Minter; John Murphey; E. H. Herschler; K. E. Stiles; Gilbert Doyle; Joe Hays.
Products To Be Shown: Honing machines.

SUPERIOR PNEUMATIC & MFG. CO.
Cleveland 25, O.
Booth No. 1224
Personnel: O. F. Palmer, sales mgr.; Carl Baehr; Harlan Unger; Orville Baxter.
New Products: Superior heavy duty air hammer—weighing less than four pounds, has the capacity of hammers weighing up to fifteen pounds.
Other Products: Bantam and Bully air hammers, blow guns, air drills, filters, and couplers.

SUPERIOR STEEL PRODUCTS CORP.
Milwaukee, Wis.
Booth No. 338

Superior heavy duty air hammer.





Encircle No. 446 on Card, Opposite Page 65



KOENIG

TWO SEAT VERNIER DEPTH GAUGE

Of particular design, easily and quickly measures distance of projections, depth of holes, etc.

ITS FEATURES

Solid head, hardened, ground and lapped.
Two Verniers, to obtain otherwise difficult measurements.
Compact design to permit the use of 1" scales.
Accurate machine divided graduations.

Furnished with case in 1" to 12" size scales—18", 24" and 36" also available. Prices on application.
A necessary tool in every tool crib and mechanic's tool box.

WM. A. KOENIG
108 Mt. View Ave. Troy, New York
Telephone AShley 2-8631

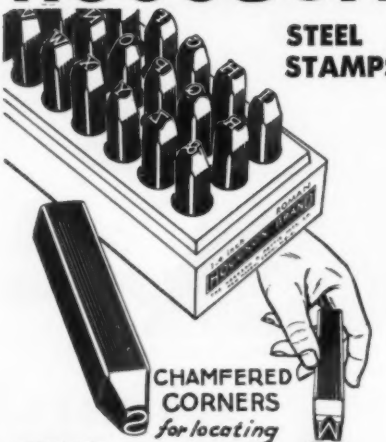
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TO BE SURE OF *QUALITY*
Remember the Name

HOGGSON

STEEL STAMPS



CHAMFERED CORNERS *for locating the base*

FINEST STEEL

long life



ALSO IN REVERSE FOR MOLDS & DIES

Letters and figures, deep-cut in hardened, special-formula steel, assure clean impressions and long service. Wide range of letter sizes. At your Mill Supply or write for circulars.

HOGGSON & PETTIS MFG. CO.
141H Brewery St. New Haven 7, Conn.

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Peterson Vibrolator, Martin Engineering Co.

SUPREME PRODUCTS, INC.
Chicago, Ill.
Booth No. 138

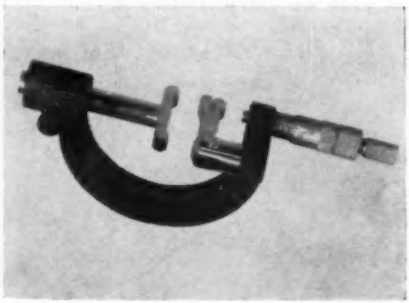
SWANSON TOOL & MACHINE CO.
Erie, Pa.
Booth No. 404

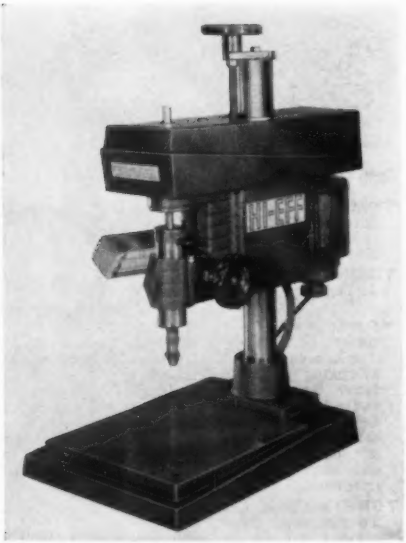
SWIVELIER COMPANY, INC.
Brooklyn, N.Y.
Booth No. 503

SYKES TOOL CORP., LTD.
Toronto, Canada
Booth No. 342
Personnel: A. G. Collings, gen. mgr.; G. P. Jones, chief engr.; A. E. Turnbull, Small Tools Sales.
New Products: Sykes vertical rack generating machine for racks up to 72" long.
Other Products: Model V1OA gear generator, for racks, gears, and special forms; gear testers, gear tooth comparators.

SYNTRON COMPANY
Homer City, Pa.
Booth No. 631
Personnel: G. C. Hilbrant, R. C. Dietsche, D. Hill, H. Fleer, L. Felke, A. M. Burch.

J. R. Reinertson taper micrometer.





Taylor Series C, Model 64 sensitive drilling machine.

C. G. Brunn, W. G. Broves, D. Bechler, C. G. Robertson, R. P. Bentzen, J. F. Young.

New Products: Vibrating parts feeder with gravity feed track feeding 3/8" ball bearings in timed sequence. Rate of discharge of bearings from track can be changed to feed from a continuous rate up to one every 30 seconds, one every minute, etc.

Other Products: Vibrators, feeders, hoppers, screens, etc.

TAYLOR DEVICES
N. Tonawanda, N.Y.
Booth No. 292
Personnel: Paul H. Taylor

TAYLOR DYNAMOMETER
Milwaukee, Wis.
Booth No. 779

THE TEXAS COMPANY
New York, N.Y.
Booth No. 1236

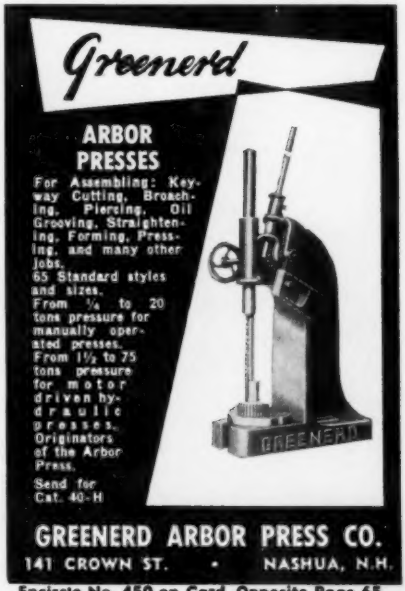
THOMPSON CO., EARL A.
Ferndale, Mich.
Booth No. 1444
Personnel: R. C. Hallock

THREAD-ALL SALES COMPANY
Detroit, Mich.
Booth No. 748

TOCCO DIVISION, THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio
Booth No. 440



Encircle No. 449 on Card, Opposite Page 65



Encircle No. 450 on Card, Opposite Page 65

SPECIFY KASSON PRECISION COLLETS AND ATTACHMENTS

IMMEDIATE DELIVERY FROM STOCK

3AT, 3C
1A, 4C
5C

KLUTCH-KOLLET
Step collet for accurate chucking to 2¾" dia. Soft head for easy boring. Lowest price on market! Models 3AT, 3C, 5C.

(C-50)

All collets in hexagon, square and round.

FOR ATLAS • LOGAN • SOUTH BEND
CRAFTSMAN • SHELDON LATHES, ETC.

LEVER-TYPE DRAWBAR ½" cap.

Positive grip on undersize, oversize or standard diameter work! Patented coordinate cams eliminate fingers.

Let us quote on your quantity orders for any type of collet, live center or other machine tool attachment!

HAND DRAWBAR ½" cap.

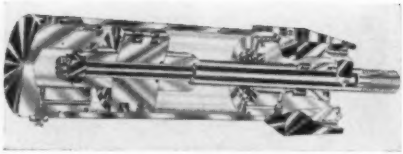
LIVE CENTER (Ball Bearing) Double sealed for accuracy.

KASSON Precision

KASSON Precision products are guaranteed unconditionally for accuracy, fit and long life. Your dealer should have them . . . Write us for literature!

KASSON DIE AND MOTOR CORP.
32-14 Northern Boulevard
LONG ISLAND CITY 1, N. Y.
Integrity Since 1919

Encircle No. 451 on Card, Opposite Page 65



Spacemaker air or oil cylinder.

TOMCO PRODUCTS
Racine, Wis.

Booth No. 1213

Personnel: V. T. Thomas

TOMKINS-JOHNSON CO., THE
Jackson, Mich.

Booth No. 225

Personnel: D. M. Tracey; W. J. Donnelly; W. J. Remund; R. L. Curtis; A. P. Jankowski; J. R. Krome; E. Shaw; P. Watson; A. Wenckus.

New Products: Spacemaker air or oil cylinder, T-J interchangeable head reamers.

Other Products: Standard tie rod type air cylinders, hydraulic cylinders, T-J die sinking milling cutters, clinch nut machine.

TORRINGTON COMPANY
Torrington, Conn.

Booth No. 219

TORIT MANUFACTURING CO.
St. Paul, Minn.

Booth No. 151

Personnel: Frank Chase, sales mgr.; E. A. Davenport; Andrew Wands; Paul Neuses.

New Products: New models of dust col-

Torit Model 64 dust collector.





Tree 2UVR vertical milling machine.

lectors; exhaust silencer.
Other Products: Cyclone dust separators, dust collectors.

TREE TOOL AND DIE WORKS
Racine, Wis.

Booth No. 605

Personnel: James Tree, Charles Tree, William Ballantine, Kenneth Pedersen.
New Products: 2UVR vertical milling machine, designed for use in toolrooms, experimental departments, pattern shops, or for production. Machine is designed for ease of operation, greater work capacity.
Other Products: 2UV Mill; MH4 milling head; TB4 taper boring tool; inner mill, and other accessories.

TRUE-TRACE SALES
El Monte, Calif.

Booth No. 760

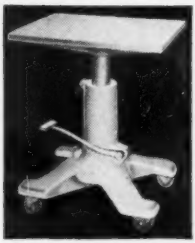
Personnel: G. F. Fry, Jr.

TUBULAR MICROMETER CO.
St. James, Minn.

Booth No. 924

Personnel: H. M. James, pres.; R. L. Johnson, sales mgr.; A. Arnson, chief insp.; R. Clark, eng.; R. Anderson; Dale Freyberg; N. Meyers; P. White.
New Products: "Tumico" optic vernier height gage, new dial indicator, bench centers, bench micrometer.
Other Products: Precision measuring instruments, including micrometers, calipers, vernier tools, dial indicators, other special gage applications.

PORTABLE
ELEVATING TABLE



Saves TIME and LABOR

Eliminate heavy lifting and cut handling costs. Slight foot pressure varies height from 31" to 46½", leaving operator's hands free. Table swivels and locks in any position.

Our major services — Designing and Building — Dies, Jigs, Fixtures and Special Machinery.

SEND TODAY FOR ILLUSTRATED CATALOG No. 2

THE MIDWEST TOOL & ENG. CO.
112 WEBSTER ST., DAYTON, OHIO

Encircle No. 452 on Card, Opposite Page 65

Miccro *Supreme*
LAY-OUT AND IDENTIFICATION DYE



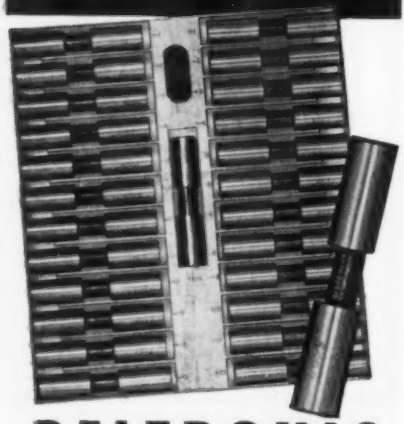
7 COLORS

For Tool, Die, Pattern or Template layout on metal . . . Quick identification of bar stock, sheets, strips or parts . . . Shows up in sharp relief—dries instantly . . . Write for sample and circular on company letterhead.

MICHIGAN CHROME & CHEMICAL COMPANY
8615 Grinnell Ave. • Detroit 13, Mich.

Encircle No. 453 on Card, Opposite Page 65

CLOSER PRODUCTION TOLERANCES!



DELTRONIC Tenth Plug Gauges

save time and material, too!

This new system of precision gauging in sets of 25 provides one gauge of nominal size plus 12 gauges of increasingly larger sizes in .0001" increments and 12 gauges of decreasingly smaller sizes in increments of .0001".

- ★ Size variation by ten thousandths
- ★ Available in increments of 1/64" from 1/8" to 1"
- ★ Set of 25 costs approximately same as Go and No Go gauge
- ★ Hardness is Rockwell C62/C64

For further information write Dept. D.

DELTRONIC CORPORATION
1507 RIVERSIDE DRIVE
LOS ANGELES 31, CALIF.

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TUBULAR RIVET & STUD CO.
Wollaston, (Quincy) Mass.
Booth No. 670

TWENTIETH CENTURY MFG. CO.
Libertyville, Illinois
Booth No. 241

UDDEHOLM CO.
New York, N.Y.
Booth No. 234
Personnel: E. W. Dutcher

UNION MANUFACTURING CO.
New Britain, Conn.
Booth No. 808

U.S.-BURKE MACHINE TOOL CO.
Cincinnati, O.
Booth No. 604
Personnel: S. C. Straus

UNITED STATES RUBBER CO. MECHANICAL GOODS DIV.
New York, N.Y.
Booth No. 792

UNIVERSAL CYCLOPS STEEL CORP.
Titusville, Pa.
Booth No. 552

UNIVERTICAL FOUNDRY & MACH. CO.
Detroit, Mich.
Booth No. 202
Personnel: C. T. Walker

THE V & O PRESS COMPANY & HENRY & WRIGHT, DIVISIONS OF EMHART MFG. CORP.
Hudson, N.Y.
Booth No. 509

VALENITE METALS CO.
Detroit, Mich.
Booth No. 1124
Personnel: K. Dixon

VALVAIR CORP.
Akron, O.
Booth No. 130
Personnel: F. J. Ricketts

VANADIUM-ALLOYS STEEL CO.
Latrobe, Pa.
Booth No. 1511

Vickers T8 pipeless power package.



Now Available in . . . "SPRAY ON" CANS and in "BULK"

CROWN design layout ink



Order it the way you use it — in handy 12-oz. Aerosol spray cans, or by the pint, quart, gallon or barrel in bulk! Crown ink dries to an excellent scribing texture in a minute! Ideal for pattern, "OK" or "reject" marking.

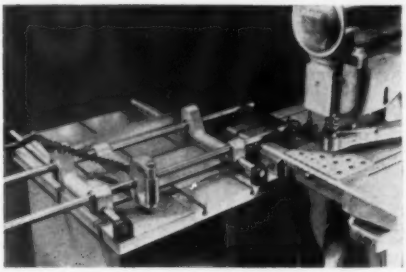
Contact your distributor, or write:

Just Press the Trigger on the Can

CROWN INDUSTRIAL PRODUCTS CO.

807 Amsterdam St., Woodstock, Ill.

Encircle No. 455 on Card, Opposite Page 65



Wales-Strippit positive duplicator.

THE VAN KEUREN COMPANY
Watertown, Mass.
Booth No. 1037

VAPOR BLAST MFG. CO.
Milwaukee, Wis.
Booth No. 218

VASCOLOY-RAMET CORPORATION
Waukegan, Ill.
Booth No. 1137

VICKERS INCORPORATED
Detroit 32, Mich.
Booth No. 1411
Personnel: E. J. Doucet, A. T. Hards, E. O. Clark, R. E. Esch, F. T. Harrington, M. R. Fox, L. Haisen, J. Arends, R. Thoren, R. Mezger, P. Barker, A. Van Wormer.
New Products: T8 pipeless power package, variable delivery pump (pressure compensator control with a 5000 psi power unit), Constant delivery pump (for continuous duty up to 5000 psi), deceleration valves, oil coolers, relief valves, other hydraulic equipment.
Other Products: Complete line of hydraulics—pumps, motors, valves, and accessories.

VICTOR ADDING MACHINE CO. MC CASKEY REGISTER DIV.
Chicago, Ill.
Booth No. 679

VLIER ENGINEERING CO.
Los Angeles, Calif.
Booth No. 1113
Personnel: B. H. Vlier

VULCAN TOOL CO.
Dayton, O.
Booth No. 515
Personnel: G. Letsche

WADELL EQUIPMENT COMPANY
Garwood, N.J.
Booth No. 135

WALDES-KOHINOOR, INC.
Long Island City, N.Y.
Booth No. 251

WALES-STRIPPIT CORP.
North Tonawanda, New York
Booth No. 379
Personnel: R. W. Boebel; R. Schweizer; J. E. Ringer; L. J. Haney; B. L. Gaines; H. Gray; C. Somerton; N. F. Weyland; R. J. Bamberger; R. J. Cech; W. A. Schrader; R. J. Frantz; R. G. Anger; E. A. Taylor; J. W. Gaul; W. Armitage; J. S. Tracy.
New Products: Positive duplicator for use with punching template; tube piercing unit.
Other Products: 10-AA fabricator; punching and notching equipment.

WALKER-TURNER DIVISION KEARNEY & TRECKER CORP.
Plainfield, N.J.
Booth No. 1525

WARD-RIDDLE CO.
Ravenna, O.
Booth No. 312
Personnel: Hugh Riddle

WARNER & SWASEY RESEARCH
New York, N.Y.
Booth No. 646

WEBBER GAGE COMPANY
Cleveland, Ohio
Booth No. 936

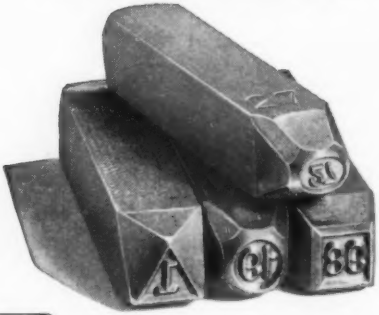
THE WELDON TOOL COMPANY
Cleveland, Ohio
Booth No. 629

WELLS MANUFACTURING CORP.
Three Rivers, Mich.
Booth No. 274

WESSON COMPANY
Detroit, Mich.
Booth No. 450

WEST POINT MFG. CO.
Detroit, Mich.
Booth No. 290
Personnel: J. H. Burke

INSPECTORS' and CODE SYMBOL STEEL STAMPS...



98 5/16" 98 1/4" 98 3/16" 98 5/32"

ACTUAL SIZE OF IMPRESSION

. . . for quality control IN YOUR PLANT . . . quick identification of inspector, company or part supplier, machine operator, shift, operation, etc.

. . . for the mark of controlled quality on your product.

YOUR CUSTOMERS recognize your inspection mark as a symbol of insured dependability.

Identification numbers from (1) to (99), inside standard 5/32, 3/16, 1/4 and 5/16 inch borders. Special sizes and symbols on request.

Write for complete Catalog NM-51.

NEW METHOD STEEL STAMPS, INC.

147 Jos. Campau · Detroit 7

Encircle No. 456 on Card, Opposite Page 65

WESTPLEX CORP.
Rochester, N.Y.
Booth No. 1207
Personnel: J. A. West, Jr.

WHEELABRATOR CORP.
Mishawaka, Ind.
Booth No. 146
Personnel: A. E. Lenhard

THE WHITON MACHINE COMPANY
New London, Conn.
Booth No. 730

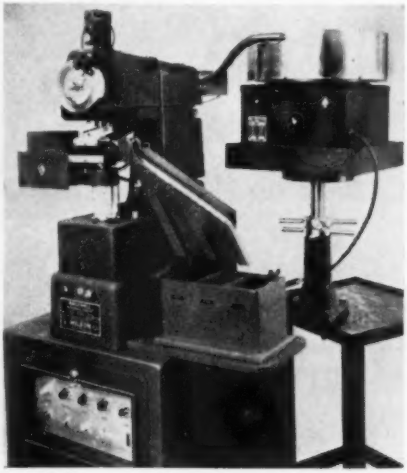
WICKMAN MFG. CO.
Oak Park, Mich.
Booth No. 597
Personnel: H. Mandel

WILLEY'S CARBIDE TOOL
Detroit, Mich.
Booth No. 653
Personnel: Don McPherson

WILSON MECHANICAL INSTRUMENT DIV., AMERICAN CHAIN AND CABLE CO., INC.
New York 17, N.Y.
Booth No. 909
Personnel: V. E. Lysaght, W. Leopold, L. J. McNally, G. E. Naslund, P. Fee, J. L. Kavalaris, L. Horneyer, R. L. Woizeski, and P. Kenyon.
New Products: Automatic classifying and sorting hardness tester. Ferrous and non-ferrous parts can be tested and sorted at the rate of 1,000 parts an hour.
Other Products: All types of Rockwell hardness testers, including models with gear testing fixtures.

WILTON TOOL MFG. CO., INC.
Schiller Park, Ill.
Booth No. 1208
Personnel: Mr. H. W. Vogl, A. J. Vogl, W. J. Ferrick, D. G. Matthews, O. Rische, R. Gabori, C. W. Kujak, F. Miller.
New Products: WiltOmatic air hydrau-

Wilson fully automatic hardness tester.

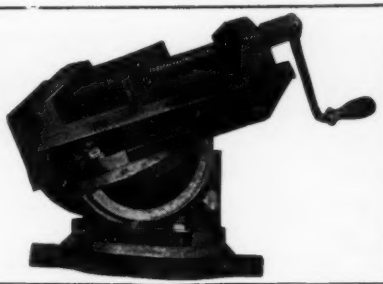


SET UP COMPOUND ANGLES INSTANTLY!

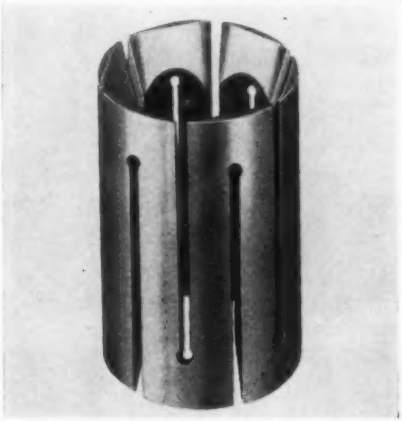
Now save valuable time on intricate, angular set-ups with the fully universal MASTER MULTI-SWIVEL VISE. Three swivels instantly set any compound angle. Used worldwide. Interchangeable platens optional.

Write for circular.

DONOVAN MFG. CO.
80 Batterymarch St. Boston 10, Mass.



Encircle No. 457 on Card, Opposite Page 65



Woodworth "Tork-lok" collet.

lic bench vises, fixture and jig automatic clamps, MilOmatic machine vises, Rapid Titan clamps and woodworking vises.

Other Products: Machinists' vises, combination vises, PowRarm work positioners.

WISCONSIN DRILL HEAD CO.
Butler, Wis.

Booth No. 502

Personnel: S. Pohlhammer, pres.; J. Schultz, sec. & treas.; R. E. Bodendoerfer, sales eng.; P. Martin, sales eng.; D. Pohlhammer, eng.

New Products: Automatic lead screw tapping unit to be used in conjunction with tapping heads and for tapping machine applications.

Other Products: All models of adjustable drill heads.

WOODWORTH CO., N. A.
Detroit 20, Mich.

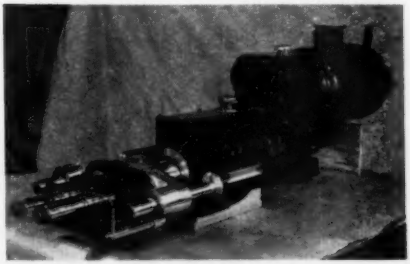
Booth No. 412

New Products: "Tork-lok" collets — a new design employing the use of inclined flats in both collet sleeve and arbor shaft, eliminating clearances of the cone design.

ZAGAR TOOL, INC.
Cleveland, Ohio

Booth No. 179

Wisconsin automatic lead screw tapping unit.





DYKEM STEEL BLUE®

Stops Losses making Dies and Templates

Popular package 8-oz. can fitted with Bakelite cap holding soft-hair brush for applying right at bench; metal surface ready for layout in a few minutes. The dark blue background makes the scribed lines show up in sharp relief, prevents metal glare. Increases efficiency and accuracy.

Write for sample on company letterhead

THE DYKEM COMPANY
2301G North 11th St. • St. Louis 6, Mo.

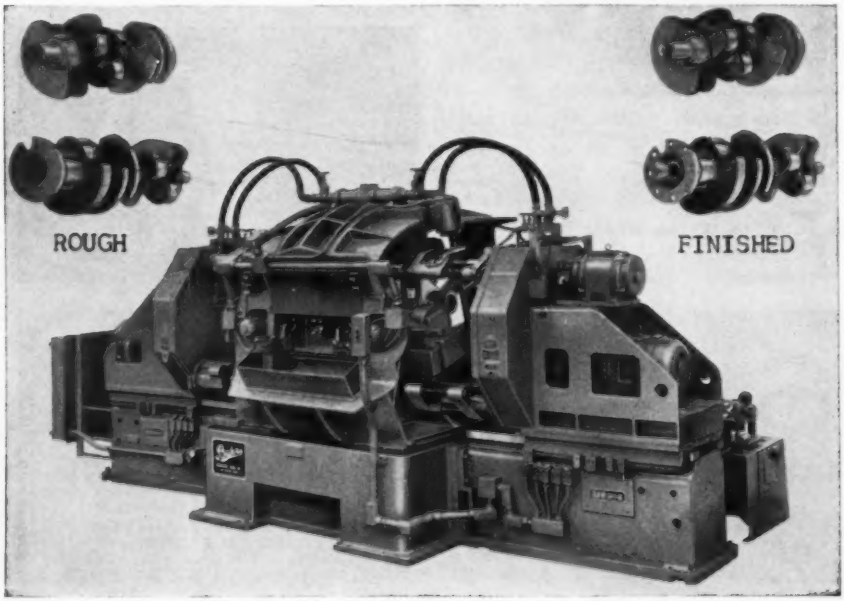
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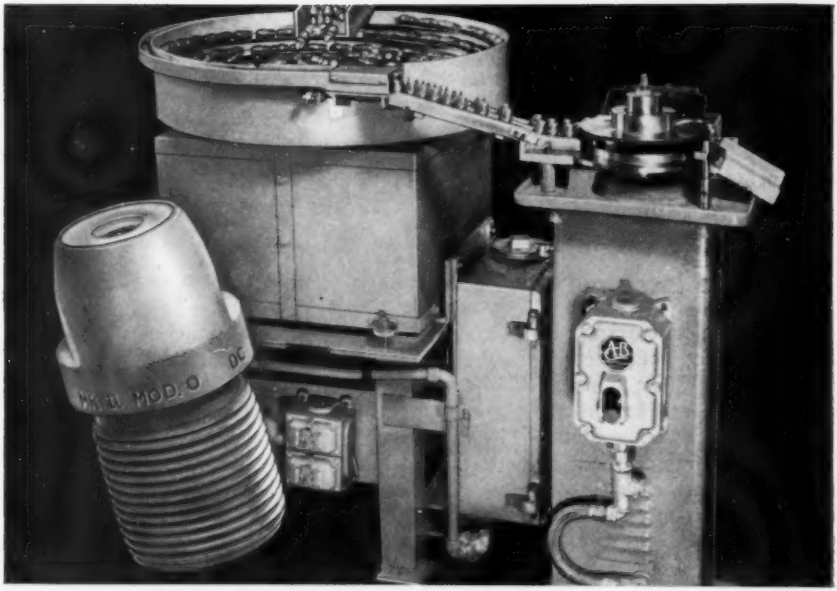
Field Report OF IMPROVED PRODUCTION TECHNIQUES

Machine Performs 34 Operations on 70 Crankshafts Each Hour

Thirty-four operations on 70 pieces per hour are performed on Plymouth engine crankshafts by the 2-way Buhr Economatic, which features Powerflo indexing, power clamping of fixtures by means of a power wrench with torque control, multiple heads of master-gear-box construction with individual cluster heads. Bushing plates register into fixtures at each station.

Thirty operations are performed from the left-hand side: drill one 27/64″-diameter hole, one 57/64″-diameter hole and seven 7/16″-diameter holes; face center hole to 30° angular seat and drill to 27/32″-diameter,





Model 435 — Speed-marks up to 7500 parts per hour.

AUTOMATION IN METAL MARKING

Here it is . . . the new NOBLEWEST hopper and dial-feed Roll-Marking Machine. With its fully automatic features, it is ideal for integrated line production. With a vibratory feeder, parts are fed to the machine, then **permanently** marked and automatically ejected. Can be used for **speed-marking** solid round, heavy walled, or conical parts. Like all Noblewest Roll-Marking equipment, it produces permanent deep impressions . . . good for the life of your product . . . faster, better and at lower cost. For detailed information on this machine or any marking problem write Noble & Westbrook Mfg. Co., 9 Westbrook St., East Hartford 8, Conn.

See the Noblewest Mark-O-Rama at the Tool Engineers Show

Visit Booth 767 for The Latest Developments in Modern Metal Marking Equipment

NOBLEWEST 50TH ANNIVERSARY

MARK IT BEST WITH

NOBLEWEST

Encircle No. 459 on Card, Opposite Page 65

countersink eight holes; ream seven .4533″-diameter holes, one .9085/.9090″-diameter hole to depth and one .4402″ hole; countersink one hole to 60° included-angle.

Operations performed on the right-hand side: drill one 1-1/16″-diameter hole; spotface one 1⅝″-diameter hole; counterbore one 13/16″-diameter hole and form 60° seat. Buhr Machine Tool Co., Ann Arbor, Mich.

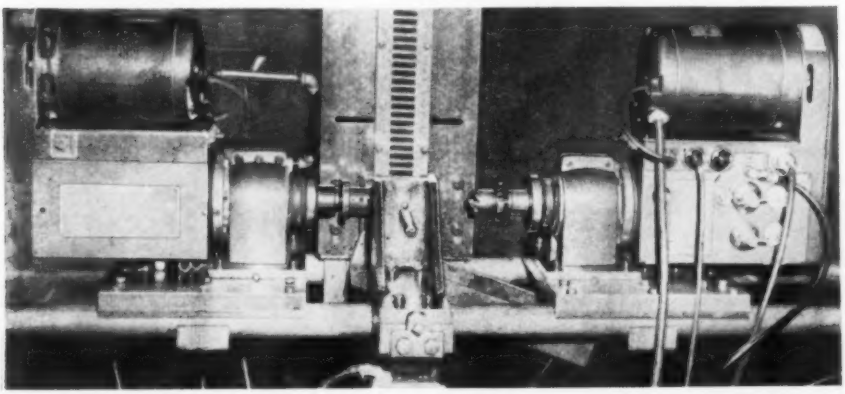
Production Increased 300%

Production has jumped from 135 to 500 pieces per hour for Star Tubular Products Co., Chicago, on a facing and de-burring operation on welded steel pipe sections. Two automatic drill units, standard Dumore models with all pneumatic and electric controls built in, were the only major equipment purchased.

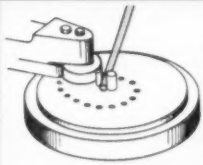
Formerly, the facing and de-burring job required handling each part three times: once to do one end, then a separate handling operation to remove the part and reverse it in the work fixture, and finally the facing and de-burring of the opposite end.

Now, the pipe sections are stacked in a hopper which delivers them to a fixture. As the part falls into the fixture, a clamping device is actuated. This also triggers the two drill units which advance both drill heads simultaneously, face and de-burr both ends of the part and then retract—all automatically. Work feed is controlled through the automatic circuits in the drill units.

Not only has this automatic setup boosted production, but increased accuracy of the finishing process has permitted the company to roll-cut the pipe sections instead of square cutting, for a 300% reduction in cutoff time. Dumore Co., Racine, Wis.

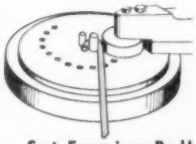


HOW TO BEND bars and tubing

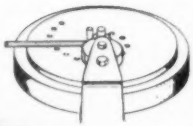


Insert bar stock between Locking Pin and Radius Pin of desired size.

1 OFF CENTER EYES

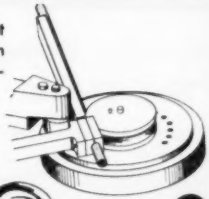


2 Set Forming Roller against material and advance Operating Arm.

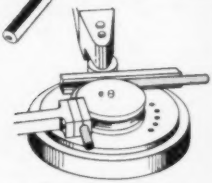


3 Complete operation with one steady movement.

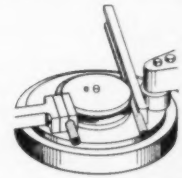
Clamp tube. Insert Follow Block between material and Forming Roller.



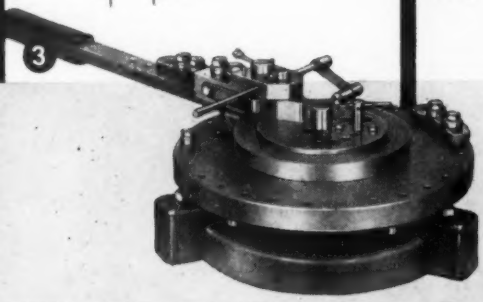
TUBING 1



Advance Operating Arm until it strikes Angle Stop. 2



Remove Follow Block, release clamp and remove tube. 3



with a DI-ACRO BENDER

Complete details on forming rods and tubing with standard accessories as well as tips and technical data on angle, channel and other materials will be found in "It's easy to bend", a 32 page summary of Di-Acro Benders and bending. A copy is yours free of charge.

pronounced die-ack-ro

di-acro PRECISION METALWORKING MACHINES

Consult the yellow pages of your phone book for the name of your nearest Di-Acro distributor or write:



O'NEIL-IRWIN MFG. CO.

314 8th Ave. Lake City, Minn.

Encircle No. 460 on Card, Opposite Page 65

Field Report

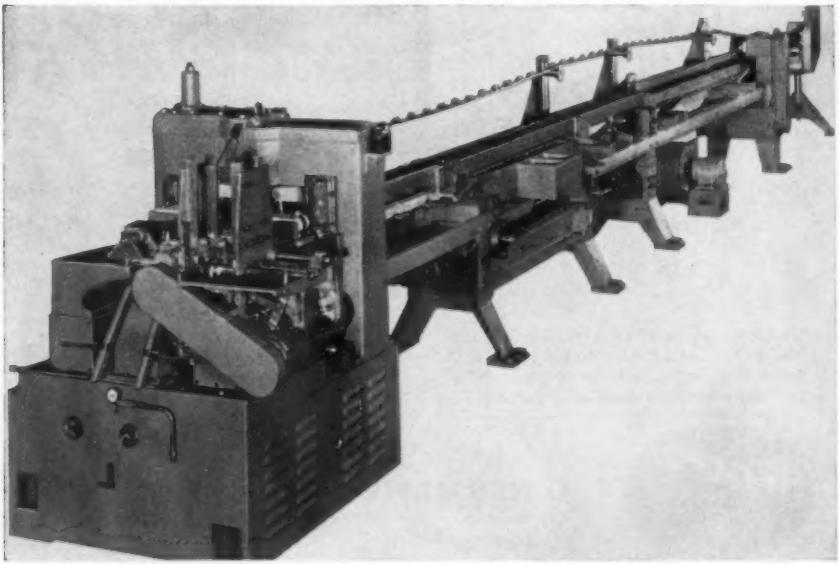
Bodymaker Produces Sanitary Cans At Near Machine Gun Speeds

A high-speed bodymaker, producing 400 to 450 cans per minute, has been developed by E. W. Bliss Co., Dept. RH, Canton 10, O. Known as the No. 403, it is the latest machine in Bliss' new line of automatic, high-speed can making machinery and incorporates many new design features.

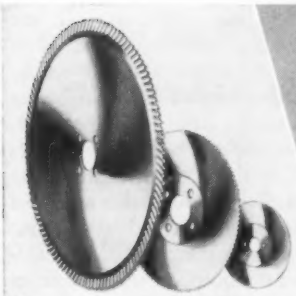
Most significant development is its compactness. The work table is equipped with knurling, notching, edging and pre-fluxing attachments, yet it has no idle station. A new single-station double action edger is driven by a short eccentric which contributes to the speed. The forming horn is stationary, which permits perfect alignment with the solder attachment. A cam-actuated overhead blank lock prevents movement in the forming station and assures a well-rounded can. Notching chips are removed by compressed air to prevent their jamming the carbide dies or getting into machinery. The bodymaker is furnished complete with automatic controls, limit switches and Bliss control panel.

Built for sustained, automatic operation at high speeds, the bodymaker handles cans ranging from 2⅜" to 5⅛" in height and from $2\frac{1}{16}$" to 4¼" in diameter.

In addition to these features, Bliss engineers have incorporated other proven bodymaker design principles. These include the use of short-stroke short-length cranks and eccentrics for smooth operation at high speed; a simplified design so that essential parts likely to require adjustment are readily accessible; and a rugged cast Meehanite base and frame.

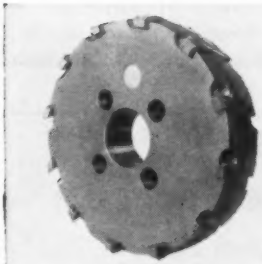


Seeing is Saving
at MOTCH & MERRYWEATHER'S booth 1021
A. S. T. E. EXPOSITION, CHICAGO



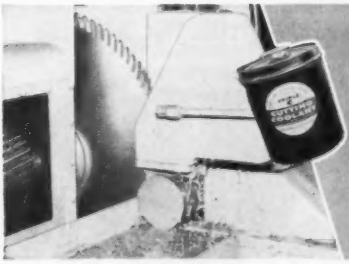
M & M Triple-Chip Saw Blades
Save Waste in Metal Sawing

Complete line — segmental and solid — cut-off up to 108" dia., slitting down to 3" — for any machinable material, ferrous or non-ferrous, any size, any shape, any thickness. Less tooth strain, longer blade life, substantial savings in time and costs.



KROSLOK Milling Cutters
Save Time in Precision Milling

Kroslok Face Milling Cutters and Shell End Mills cut any machinable material. Simplest design; only three members—body, blade, wedge. Serrations in body mate with cross serrations in blade. A profit-showing aid to accurate production milling.



Three Triple C Products
Save Trouble in Tool Care

Triple C Grinding Coolant, Cutting Coolant and Machine Cleaner are Cool, Clear, Clean. Anti-rust, non-greasy, smokeless, odorless, foamless, non-flammable, non-clogging, safe for operators. A notable contribution to tool maintenance.

THE MOTCH & MERRYWEATHER MACHINERY CO.

Cutting Tool Manufacturing Division

Stocking Dealers in All Principal Industrial Centers

1250 EAST 222nd STREET, CLEVELAND 17, OHIO

Encircle No. 461 on Card, Opposite Page 65

Field Report

Vertical Hydraulic Machine Assembles, Burnishes, Drills

This vertical hydraulic machine with automatic cycle assembles bushings into the wrist pin hole of an automotive connecting rod, burnishes the bushing, center drills one wall of the wrist pin bore and then drills an oil hole through. The unit was developed and built around a 3-way type machine column, arranged with a six-station index table. Mounted on the table are six, 2-station fixtures which hold two parts each. The operator loads and unloads parts at the front as the fixtures index past the station. The assembly, burnishing and two drilling units are arranged around the periphery of the indexing table.

At the assembly station a hopper feeds the split bushings to a slide which automatically moves the bushings into position for assembly. Following assembly of the bushing to the wrist pin bore, the parts are indexed to the burnishing station. HSS burnishing tools are pushed through, burnishing the id of the bushings. A stripper plate allows the burnishers to return, after which the parts index to the first drilling station. Here one wall of the wrist pin bore is spot-drilled. At the last work station the oil hole is drilled through the wall and the parts are then indexed to the unloading and loading station. Both drilling stations are equipped with 2-station self-contained drilling units and separate electric motors. Manufacturer is the American Broach & Machine Co., Dept MTB, 415 W. Huron St., Ann Arbor, Mich.



MR. MANUFACTURER

HAD A MARKING PROBLEM!

Marking his stainless steel drain collars required two separate operations on a 500-ton stamping press. Production was hampered, and many collars were damaged in marking. Then he consulted Matthews . . .

A Matthews Motorized #204 Machine now marks his collars in one operation, at lower cost-per-mark, and without distortion—the perfect solution to his marking problem. For a free analysis of your marking problem, write or phone Matthews today!



JAS. H. MATTHEWS & CO.

3946 Forbes Street • Pittsburgh 13, Pa.

CLIFTON, N. J. BOSTON PHILADELPHIA CHICAGO

Encircle No. 462 on Card, Opposite Page 65

Stone M-35A

cuts faster, cleaner, at lower cost

than any machine of its type!

Capacity: Ferrous 1½" Solids, 2½" Standard Pipe and 2½" Structurals. Non-Ferrous, 2½" Solids, 3" Tubing and Extrusions.



Model M-35A
12" Cut-Off Machine

The Stone M-35A cuts with a milled finish to a tolerance of ±.005" any degree up to and including 45°—either direction. Positive geared-in-head drive, a Stone exclusive, delivers *complete* power to the cutting wheel. Cuts ferrous and non-ferrous solids at the rate of less than 4 seconds per square inch! Precision-engineered, rugged and durable. Motor is 3½ HP, enclosed, fan cooled, induction type 220/440 volt, 60 cycle, 3 phase (other voltages on request).

Machinery by Stone includes a complete line with many optional features. Write for complete information, no cost or obligation.

"... represented in every major industry throughout the world"

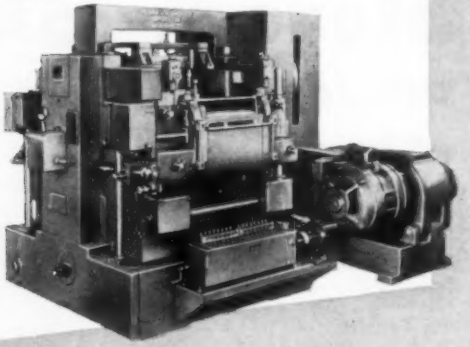
STONE MACHINERY CO., INC.

11 Fayette Street, Manlius, New York

Encircle No. 463 on Card, Opposite Page 65

FERRACUTE SUPER SPEED PRESS

25-Ton Super Speed Press in demonstrating operation on our floor, at 750 strokes per minute. Available for IMMEDIATE SHIPMENT.



Need fast production of small metal parts...now?

- **get a FERRACUTE SUPER SPEED PRESS**
- **get IMMEDIATE DELIVERY on some models**
- **get continuous, sustained operation up to 750 STROKES PER MINUTE**

FERRACUTE'S SUPER SPEED PRESS gets its speed from the horizontal reciprocating action of the die bed while the punch member takes its motion direct from crank shaft. Takes standard die sets, reduces die costs because of less frequent grinding. Is working successfully on electral grade steel, cold rolled steel, nickel alloy steel, brass, copper, etc. Models—7½ and 25 tons. Write for full details. Wire for appointment for demonstration.

Super Speed Press Division

FERRACUTE MACHINE COMPANY

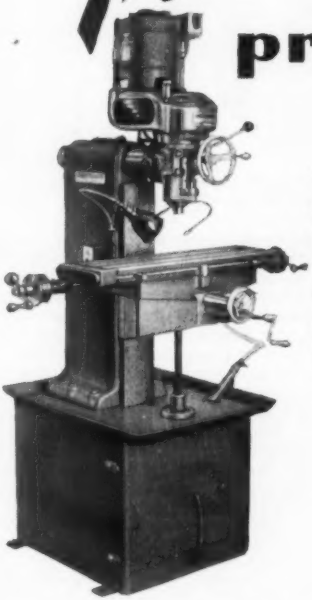
Since 1863 Manufacturers of Power Presses and Special Machinery

BRIDGETON, NEW JERSEY

FERRACUTE

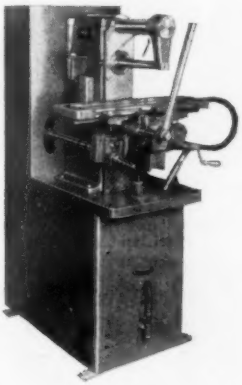
Encircle No. 464 on Card, Opposite Page 65

Proven~ economy versatility precision



Write for list of well-known users.

The newest miller by Crowningshield, Model VM-1, combines quality and economy in a rugged, versatile machine. Available with Bridgeport "M" Milling Attachment, as shown, or without any head. Available with rack feed or screw feed as desired.



50 years of milling machine manufacture makes us certain this No. 3 Miller is the solution to many of your high production milling problems. A tested profit-maker. Let it prove itself for you!

Write for details and prices on these and other models.

CROWNINGSHIELD

711 COUNTRY CLUB RD. *Est. 1906* GREENFIELD, MASS.

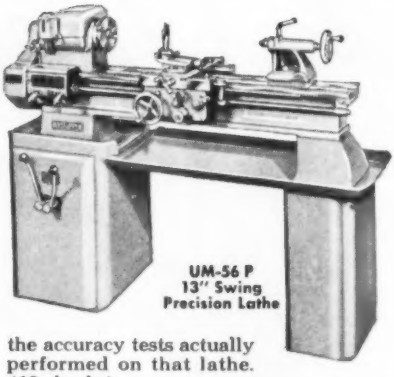
SHELDON Precision LATHES

for the size Lathes You Need Most

Sheldon lathes are built in the sizes you need most, for toolroom and production jobs. They are available with swings of 10", 11" and 13". . . in varying bed lengths with 18" to 48" center distances . . . and . . . in your choice of pedestal, cabinet or bench mountings.

Powerful, all-V-belt, drive units—either the standard 8-speed (or 16-speed) E-drive; or the production favorite, a rapid, lever-shift U-drive. Where higher spindle speeds are desired, the standard E-drive can be built to provide speeds up to 2,000 r.p.m.

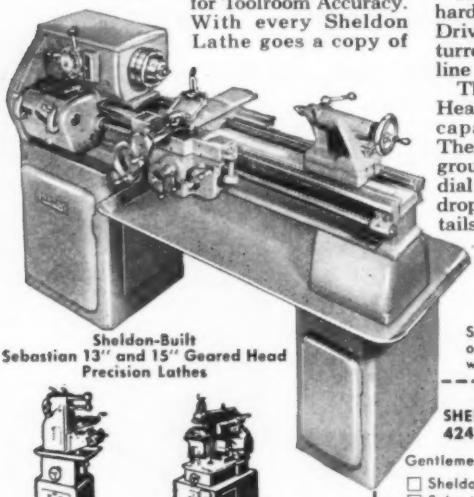
All Sheldon Lathes have handscraped, built-in precision. Each lathe is guaranteed to meet or surpass the American Standards for Toolroom Accuracy. With every Sheldon Lathe goes a copy of the accuracy tests actually performed on that lathe. (19 checks).



UM-56 P
13" Swing
Precision Lathe

Important optional features include: hardened bed ways, L00 Long Taper Key Drive spindles, 4" D1 Camlock spindles, bed turrets, taper attachments and a complete line of toolroom and production accessories.

The new Sheldon-built Sebastian Geared Head Lathes have greatly increased work capacity and many advanced features. These include a wide, heavy, hardened and ground bed . . . easy shifting spindle speed dial . . . 60-pitch gear box . . . independent drop lever apron clutches . . . cam-action tailstock clamp . . . and, automatic lubrication in the headstock and apron with "1-shot" lubrication of carriage.



Sheldon-Built
Sebastian 13" and 15" Geared Head
Precision Lathes

SHELDON
Horizontal Milling Machine

SHELDON
12" Shaper

SHELDON MACHINE CO., Inc.

Builders of Sheldon Lathes, Milling Machines, Shapers and Sebastian Lathes.

4242 North Knox Ave • Chicago 41, Ill.

Send in coupon or write for catalogs and names of nearest Sheldon and Sebastian Distributors where you can see these new lathes in operation.

SHELDON MACHINE CO., INC.
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Gentlemen: Please send new catalogs describing:

☐ Sheldon ☐ 10", ☐ 11' ☐ 13" Lathes
☐ Sebastian 13" and 15' Geared Head Lathes
☐ Horizontal Milling Machine ☐ Name of Local Dealer
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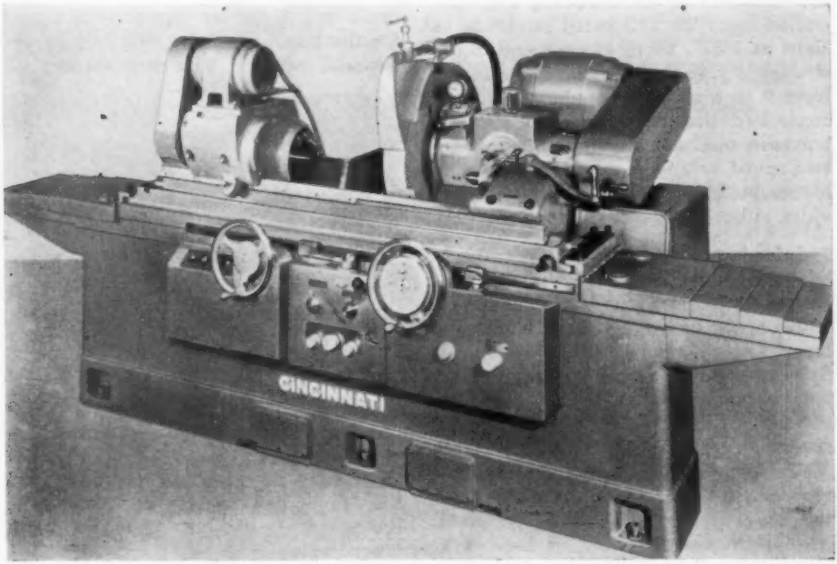
Encircle No. 466 on Card, Opposite Page 65

What's new in Metalworking

Edited by **D. M. Carlson,** Assistant Editor

Plain Hydraulic Grinding Machine Features Automatic Wheel Balancing

Many exclusive design features for traverse and infeed grinding of medium size parts are incorporated in the new Cincinnati Filmatic 6″R, 10″L, 10″R and 14″L plain hydraulic grinding machines recently announced by Cincinnati Grinders Inc., Dept. HS, Cincinnati 9, O. The two sizes followed by letter



"L" are light types having all the characteristics and built in the same lengths as the sizes immediately preceding them, but having the extra swing capacity to accommodate a flange or projecting arm on the workpiece.

Filmatic bearings have been retained for the grinding wheel spindle. These bearings consist of multiple segments, fixed axially but free to rock radially a slight amount.

Automatic Grinding Wheel Balancing, an exclusive Cincinnati feature is included as standard equipment. Controlled by a lever reached from the operator's normal working position, the grinding wheel can be balanced within 20 seconds without removing the wheel mount from the machine.

Power table traverse, hydraulically operated, provides infinitely variable traverse rates from 3" per minute (for truing) to more than 200" per minute, through a knob control. Length of table traverse may be automatically dog controlled from the full rated stroke to as short as 3/32". Tarry at each end of the stroke may be independently adjusted, from 0 to 5 seconds by means of knob controlled throttle valves. Hand table traverse, mechanically controlled, has a two speed arrangement. Merely pulling out or pushing in—the handwheel provides either .200" or ⅝" per revolution.

Infeed or cross traverse for the wheelhead is controlled from the front of the machine by means of a large handwheel at the operator's right. It features large, easy-to-read, graduated dials for fine and quick hand adjustments as low as 50 millionths on the work diameter. Automatic pick feed at table reversal is infinitely variable from .0002" to .005" diameter reduction, and may be adjusted to pick up to the positive stop at the left end of the work only, right and left end of the work, and right end of the work only.

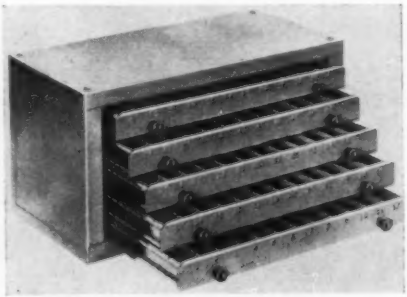
The design of the headstock unit depends upon the size of the machine. Headstocks for 6"R and 10"L machines are powered by a ½ hp, ac motor; 10"R and 14"L are powered by a 1 hp, ac motor. Four spindle speeds are available, selected by means of a V-belt riding on 4-step pulleys. Speeds range from slightly less than 100 rpm to nearly 300 rpm, depending upon electrical characteristics.

The 6"R and 10"L machines are built in 18" and 30" lengths while the 10"R and 14"L machines are built in 18", 36", 48", 72" and 96" lengths. Power ratings for the five larger sizes; 15 hp grinding wheel spindle drive motor and 1-½ hp hydraulic motor. For the two smaller sizes; 7-½ hp grinding wheel spindle drive motor and 1 hp hydraulic motor.

Use ACTION Card opposite page 64. Encircle No. 1

Wire drill assortment in dispenser

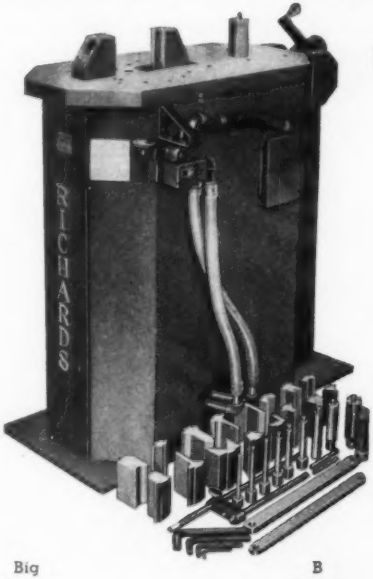
The Hayden Twist Drill Co., Dept. JS, 8626 Lyndon Ave., Detroit 38, Mich., are now packing an assortment of wire drills in a dispenser especially designed for the hardware store that has an occasional call for wire size drills.



Usually such a stock involves a comparatively substantial investment. By packing merely six to a size in the assortment the cost is held down until the store can gauge its activity in the various sizes, and tailor its stocks accordingly.

Use ACTION Card opposite page 64. Encircle No. 2

MULTIFORM BENDERS



Big Brother

B Model

¼" x 4" Capacity
Air Operated

Eliminate Special Tooling Cost
Reduce Set Up Time
Boost Production

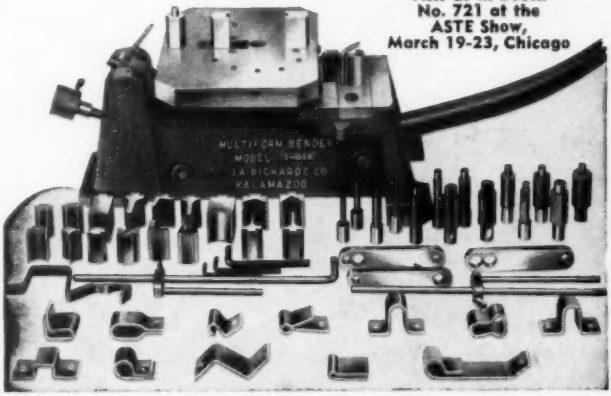
IF

Fabrication is a Problem Solve It with a Multiform.

Bus Bars - Brackets
Stampings - Springs
Steel Rule Dies etc.

J. A. RICHARDS COMPANY
KALAMAZOO, MICHIGAN

Visit us in Booth No. 721 at the ASTE Show, March 19-23, Chicago



Write today for literature

Hand and Air Models

At left is the No. 5HDSB MULTIFORM BENDER CUTTER. Capacity ⅛" x 1½".

Encircle No. 467 on Card, Opposite Page 65

Marking Machines for Special Applications

Two new models of the Matthews Airgrit marking machine, which reproduces permanent trademarks, symbols or other markings on glazed or polished metal, glass, plastic, fibre and ceramic surfaces, are now available from Jas. H. Matthews & Co., 3946 Forbes St., Pittsburgh 13, Pa. These two units are called the model 260 Stationary Top Airgrit and the Rollagrit.

The Airgrit machine marks delicate, precision or thin-walled parts without danger of fracture or distortion. Operating on a forced blast principle, it leaves an etched or frosted impression on the surface of the part by blowing fine abrasive grit through the relieved portions of a rubber mask. Made to customer requirements, masks can be quickly interchanged for different marking. Both the depth of the marking and the timing cycle are controlled. Any workman can master the use of either of the two models in less than an hour.

The model 260 contains a single jet blasting nozzle, and has a stationary top. It is recommended for marking





Encircle No. 468 on Card, Opposite Page 65

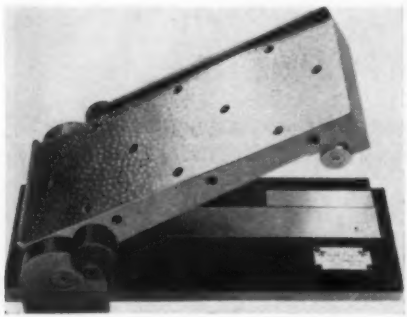
small parts at the rate of 500 or more an hour. The controlled blast is actuated by a foot switch, and it can be adapted to automatic microswitch operation. The operator sits comfortably in front of the unit, and can operate it all day with little or no fatigue. The Model "260" specifications are as follows: maximum marking area ¾" diameter; electrical current 110v - 60c - single phase; air line requirements 80 lbs. psi; floor space 18" x 20"; height 37-¼".

The Rollagrit model was designed for the marking of cylindrical parts, such as tubing, glass tumblers or breakers, or ceramic insulators and lightning arrestors and similar products. Marking production rate with this model depends on the size of the parts and the depth of marking desired. A micro-switch in the handle of the unit controls the blast. By merely pulling the handle, the part is rolled around the fixed nozzle, and the marking operation is accomplished. Rollagrit specifications are as follows: maximum marking area 3" long; electrical current 110v - 60c - single phase; air line requirements 80 lbs. psi; floor space 18" x 32"; height 42".

Use ACTION Card opposite page 64. Encircle No. 3

10" hinged sine plate has positive locking device

The positive locking device eliminates any strain on the rolls and makes it an ideal unit to use for grinding, milling, and similar operations. A .1000" recess, or step, is provided to make it easier to work with very small angles.

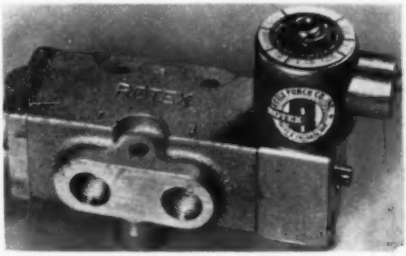


Heavy duty end and side plates and tapped holes on the working surfaces make it possible to either clamp the work or to use a magnetic chuck. According to the manufacturer, the overall accuracy is guaranteed to be within .0002". The hardened and ground rolls are held to within .0001" in diameter and their seats are hand scraped to assure maximum accuracy. Bald Eagle Tool Co., Dept. RB, 357 Minnesota St., St. Paul, Minn.

Use ACTION Card opposite page 64. Encircle No. 4

Air, Water, and low pressure hydraulic valves

Addition of ⅜-inch and ½ inch IPS 3 and 4 way air, water and low pressure hydraulic valves to Rotex's directional control valve series has been announced by Rotex Punch Co., Dept. KE, 2350 Alvarado, San Leandro, Cal.



Rotex also has announced the development of a 4 part-4 way valve in their ¼" ⅜" and ½" sizes. All models are available except double and controls, such as double solenoid pilot or cam. This model is to be known as the 4WC series.

The two new additions are constructed similar to the widely-used ¼-inch valve—chamfered air passage ports, bronze cast body, bronze sleeve, aluminum spool and interchangeable, corrosion proof operating attachments.

Use ACTION Card opposite page 64. Encircle No. 5

If **WEAR** *is a factor...*



...use

VK CARBIDE PLUG GAGES

TUNGSTEN CARBIDE

wire type .016" to .500" diameter

CHROME CARBIDE

taper insert type .500" to 1.510" diameter

In addition to its regular line of tungsten carbide wire type plug gages from .016" to .500" in diameter, The Van Keuren Company now offers a new line of chrome carbide taper insert plug gages in the range from .500" to 1.510" diameter.

Van Keuren tungsten carbide wire type gages have proved their worth on thousands of tough gaging jobs. The new chrome carbide taper inserts (Carboloy, grade No. 608*) promise to be equally effective. Wearing qualities of chrome carbide are comparable with tungsten carbide. In addition, the material is lighter than tungsten carbide and has a coefficient of expansion close to that of steel . . . both of which factors are a distinct advantage in the larger sizes.

Finish on Van Keuren gages in either tungsten carbide or chrome carbide will average .5 RMS or better. These gages are available in Class Y, X and XX accuracies at moderate prices and on a reasonable delivery basis.

*Trademark of the Carboloy Dept. of General Electric Company.

Send for a copy of the new, 258-page Van Keuren Catalog and Handbook No. 38 containing valuable technical and engineering information on measuring problems and methods. Address:

VK

37th YEAR

THE Van Keuren CO.,

177 WALTHAM STREET, WATERTOWN, MASS.

Optical Flats . . . Light Wave Equipment . . . Light Wave Micrometers . . . Gage Blocks . . . Wire Type, Taperlock and Trilock Plug Gages . . . Master Setting Disks . . . Thread Measuring Wires . . . Gear Measuring Wires . . . Carbide Plug Gages . . . Laps and Surface Plates . . . Precision Lapping Service.



Encircle No. 469 on Card, Opposite Page 65

Double Cutting Machine

Cutting lengths ranging from 22" minimum to 102" maximum can be handled on a new double cutting machine, the model DM-352, newly introduced by Stone Machinery Co., Dept. RS, Manlius, N.Y.

Designed for cutting all non-ferrous metals with saw blades, and ferrous metals with abrasive cut off wheels, the machine has two semi-independent heads that cut simultaneously. Either one may be positioned to make 90-degree cuts, or will cut at any degree up to and including 45 degrees in either direction.

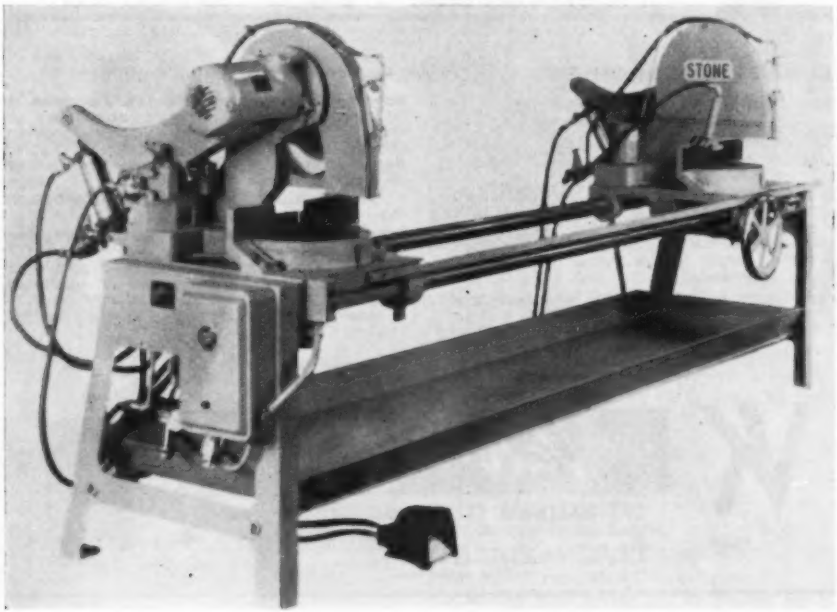
Power stroking of the cutting heads is air-actuated by a foot pedal valve with automatic return. Oil mist sprays lubricate the blades through each cut. When cuts are completed, the saw blades retract automatically into guards and the operator removes the cut section.

The machine is powered by two 3½ hp induction type geared-in-head motors 3450 rpm, geared to 3200 rpm spindle speed.

Either 12" or 14" blades may be used with the machine. With the 14" blades, cuts can be made from 1" x 6-⅛" up to 3" x 7-⅛" at 90 degrees, and 1" x 4-5/16" up to 3" x 4-⅛" at 45 degrees. Larger cutting capacities are possible by ordering special straight edges set behind the two swivel points.

Equipment with the Model DM-352 Double Cutting Machine includes an air pressure regulator gauge, oiler and filter, two automatic oil mist sprays, holding clamps at both kerfs with separate air pressure regulator and gauge. The machine requires floor space of only 26" x 120".

Use ACTION Card opposite page 64. Encircle No. 6



The Basic Idea back of *Bridgeport*

TURRET MILLING MACHINES
was conceived, created, developed and made universally practical by
BRIDGEPORT ENGINEERS



Universal acceptance of Bridgeport Millers has established beyond the shadow of a doubt that the basic principle in these machines is **RIGHT.** It also means that there was a definite need for a machine of this type to replace other machines which had outlived their usefulness. It means, too, that Bridgeport Turret Milling Machines can be installed in any shop for tool room or production line without radically upsetting procedures which have been in conventional use.

BRIDGEPORT MILLERS have met existing conditions universally. Careful planning in Bridgeport's own new shop has made it possible to offer **exclusive** advantages at a maintained reasonable price, a fact which indicates that their designers and manufacturers have made an outstanding contribution to modern metal working progress.

RIGHT ANGLE ATTACHMENTS



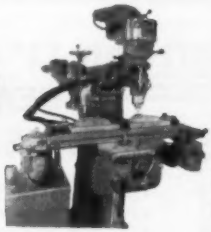
(Above), Heavy Duty . . . for milling and drilling at right angles; fits both Master and 1 HP Bridgeport Heads.



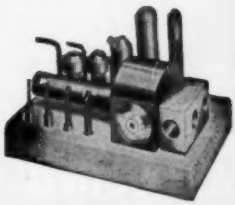
(Above) Light duty . . . for right angle milling and drilling narrow, deep molds and cavities.



CHERRYING ATTACHMENT
Makes possible production of convex and concave shapes. Ideal for producing drop forge dies, molds, cavities.



TRUE TRACE COMBINATION
The Bridgeport True Trace Combination will give excellent performance and save endless hours when copying irregular dies and molds.



No. 2 BORING HEAD
Boring Tools and Holder provide means for boring holes up to 6" diameter; available for use on Bridgeport 1 HP Milling, Drilling and Boring Attachment.

Investigation of Bridgeport Milling Machines and their many attachments is always in order.

Bridgeport MACHINES, INC.
Bridgeport Connecticut
Manufacturers of High Speed Milling Attachments and Turret Milling Machines

Encircle No. 470 on Card, Opposite Page 65

Flat Plug Gages, Snap Gage Blanks

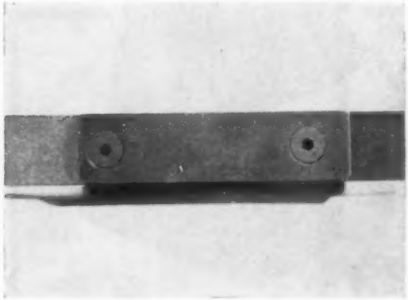
Schaefer standard reversible width gages are claimed by the manufacturer, Schaefer Gages, 39 Hale St. Ext., Rockville, Conn., to give the advantages of low first cost plus double life.

Gage ends are reversible when worn. "No go" gage end may be ground to "go" gage end when both gaging surfaces are worn. Replacement ends are available from stock.

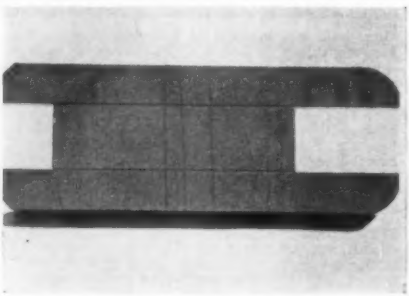
The Schaefer standard built-up snap gage blanks are made of tool steel having a hardness of Rc65. Gaging surfaces are ground finish. Sides have sand blast finish for easy handling.

Use ACTION Card opposite page 64. Encircle No. 7

Flat plug gage



Snap gage blank



RUGGED PRECISION LATHE



Harrison 11" GAP-BED GEARED HEAD PRECISION LATHE

- 24" between centers (also available in 40" centers)
- 11⅜" swing over ways • 4½"x18¾" swing in gap
- 1¼" collet capacity • Pre-loaded Timken bearings
- Threaded or American taper spindle noo • Clutch & brake

With 2 H.P. motor, controls, steady and follow rests, face plate, driver plate, cabinet base and chip pan

AMAZING LOW PRICE F.O.B. N.Y.C. $1650.

Made by T. S. Harrison and Sons Ltd., one of England's foremost manufacturers of fine machine tools. Send for catalog and price list.



Also 15" swing lathe with outstanding features, including spindle bored to pass 3" diameter bar.

Visit BOOTH 415
AT THE ASTE SHOW

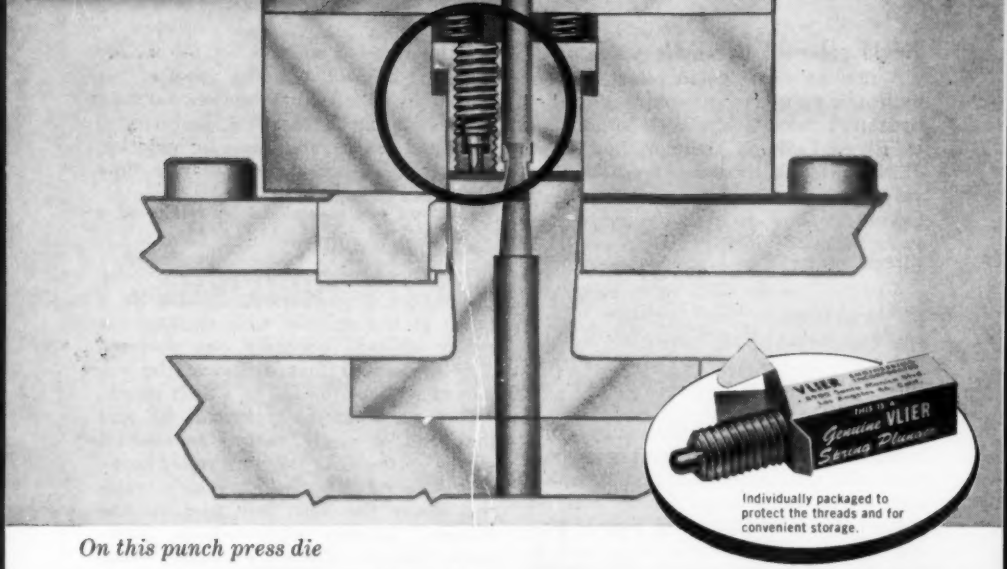
ACCESSORIES AND PARTS MAINTAINED BY U.S. REPRESENTATIVE • Stanley Sheppard • 30 CHURCH ST., N.Y. 7
AVAILABLE THROUGH YOUR DISTRIBUTOR

Encircle No. 471 on Card, Opposite Page 65

Single solenoid hydraulic valve

A new single solenoid pilot operated

and operates 2 position on the 4-way valve. It is used with the spool of the



Individually packaged to protect the threads and for convenient storage.

On this punch press die

use of a Vlier Spring Plunger saves $67.00

A typical example of how Vlier ready-made tooling accessories can save your shop hundreds of dollars every year

Formerly a "homemade" plunger device was used to break oil seals and eject parts from the punch press die shown above. Cost of resurfacing the die was unreasonably high because of time required to remove and re-install the complicated plunger device. Replacing the "homemade" assembly with a Vlier *Silvernose* Spring Plunger eliminated this lost time and, according to company tool engineers, saves $67.00 each time the die is resharpened.

As simple and quick to use as a screw

Installation and removal of Vlier Spring Plungers requires only a simple spanner-type wrench for standard nose models and an ordinary end wrench for the Hexnose type. Since only a tapped hole is required in the die, the plunger can be installed almost anywhere on the die surface. Bodies are threaded with N.C. threads, #1 fit, and rust-proofed to prevent freezing in the fixture.

Precision made

Close tolerances and large bearing surfaces between the plunger nose and the body prevent the nose from binding or wobbling, assuring perfect alignment at any extension. The nose telescopes completely within the body.

Special springs for punch press work

Springs used in *Silvernose* models were especially developed for fast, repetitive operations required in punch press work. End pressures are factory-set with the nose telescoped 50%, and are guaranteed to remain constant.

Case-hardened nose assures long life

Case-hardening of the plunger nose provides maximum resistance to wear. The ductile core minimizes the hazard of fracturing under impact, common with hardened, high carbon steel.

A variety of uses

Vlier Spring Plungers are also used to position parts in jigs and fixtures, as locating pins, as detents, etc. Your Vlier distributor stocks the complete line. Call him now and order a complete assortment. They save tool maker's time and speed fabrication of jigs, fixtures and dies.

Four Nose Types Available

Wide variety of diameters and lengths.



STANDARD NOSE Primarily for jig and fixture use.

SILVERNOSE Light end pressures for punch press operations.

PLASTIC NOSE For use with aluminum and brass.

HEXNOSE Adjusts easily with an ordinary end wrench



Write for your free copy of the new 1955 Vlier Catalog

Other Vlier tooling accessories



TORQUE THUMB SCREWS | SWIVEL-PAD CLAMPS | TOGGLE PADS | SPRING STOPS | FIXTURE KEYS

Stocked in principal industrial areas in U.S. and Canada

VLIER ENGINEERING INCORPORATED

8900 Santa Monica Blvd., Los Angeles 46, California

Single solenoid hydraulic valve

A new single solenoid pilot operated hydraulic valve for automatic control of hydraulic circuits has been announced by Rivett Lathe & Grinder, Inc., Dept. JP, Brighton 35, Boston, Mass. The new valve is the sub-plate type for panel mounting, and is conservatively designed for full 3000 psi. It is available in ½", ¾", 1", 1¼" and 1½" sizes.

The new model 6615 valve meets all jic requirements and features a full capacity rated at 3.6 gpm at 15 feet per second. Low pressure drop permits this valve to operate at maximum efficiency.

The new solenoid is the heavy, continuous type, shock resistant, and features low power consumption. It operates on only 3.6 amps inrush and .45 amps holding at 115V. The roomy wiring box has a terminal strip and is dust sealed. ½" conduit connections are provided.

The single solenoid has spring return and operates 2 position on the 4-way valve. It is used with the spool of the valve having all ports blocked neutral.

Spool is shock resistant, featuring a scalloped design and built-in metering grooves, permitting easier, faster flow and reduced impact.

Use ACTION Card opposite page 64. Encircle No. 8

40" Radial drill

The machine is powered by a 2 hp direct gear drive motor and has a No. 4 taper in the spindle with drilling capacity of 1-¾". Spindle has patented drill ejector so that drills can be removed without the use of a drift punch.

Distance from the column is 40" and the head is easily moved because it moves on the dove tail with roller bearings. There is a rapid traverse to raise and lower the head and arm on the column. Masters with Arboga, Newtown, Ohio; or Masters Precision Tools, Dept. MM, 3613 Archer Ave., Chicago 9, Ill.

Use ACTION Card opposite page 64. Encircle No. 9

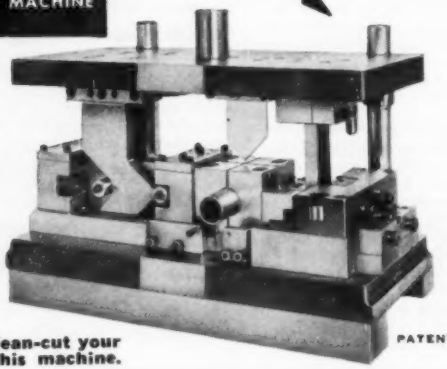
Cuts Tubing to Accurate Lengths in SPLIT SECOND TIME!

VOGEL TUBE CUT-OFF MACHINE

LENGTHS of ½ inch or more are accurately cut to ± .010" with each stroke of press—actually less than ⅓ of a second or faster than any other known method. In addition to being rapid and precise, the Vogel Cut-Off also cuts clean with a minimum of burr and distortion. Many thousands of cuts can be made before shear blades require sharpening.

Unit No. 12 accommodates tubing up to ½" O.D. with 3/32" wall; the No. 2 takes tubing up to 2" O.D. with ⅛" wall.

Ask for sample showing how clean-cut your tubing can be sheared with this machine.



PATENTED

VOGEL TOOL AND DIE CORPORATION
1825 NORTH 32nd AVENUE, MELROSE PARK, ILLINOIS

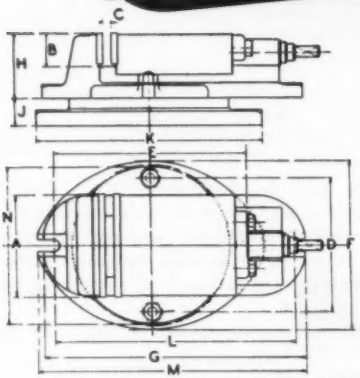
Encircle No. 473 on Card, Opposite Page 65

Gives you dependable accuracy!

ABWOOD
PRECISION
Machine Vise

. . . with the sliding jaw that can't lift and tilt the job!





- Its sliding jaw runs on "Vee" slides, is fitted with adjustment for wear and has long bearing surfaces.
- Totally enclosed hardened square thread screw can't become seized or bruised.
- Sliding jaw machined over whole surface for use of scribing block.
- Accurately machine divided swivel bases indexed fully through 360°.
- Large capacity, powerful grip, sturdy construction and high quality finish.
- No traps for swarf.
- Low height with rigidity.
- Bases drilled and reamed for insertion of tenon buttons at right angles to vise jaws.
- Crank handle supplied.

SWIVEL VISES *All parts interchangeable*

Size of Vise	A	B	C	E	F	H	J	K	M	Price
3″	3 3/16″	1 5/8″	2″	6 1/4″	5 3/8″	3 1/16″	1 1/8″	7 1/4″	9 7/8″	$ 40.00
4″	4 3/16″	1 5/8″	2 3/4″	8″	6 3/4″	3 1/16″	1 1/4″	9 1/4″	11 7/8″	65.00
6 1/2″	6 3/16″	1 7/8″	6 1/2″	11 3/4″	10 1/8″	3 3/4″	1 5/8″	13 3/4″	17 3/4″	125.00
8″	8 3/16″	2″	8″	13 3/4″	12 3/4″	3 3/4″	1 3/4″	15 5/8″	22″	165.00
12″	12 1/4″	2 5/8″	12″		14 1/4″	5 1/8″	1 7/8″	17″	24 7/8″	275.00

Order today or write for further information to Dept. B-1

DeWitt

DE WITT EQUIPMENT CORPORATION
190 ELIZABETH AVE., NEWARK 8, N. J.

Encircle No. 474 on Card, Opposite Page 65

REDUCE THREAD CUTTING COSTS WITH NEW "ST" THREADING TOOLS



Precision ground cutters



Any Standard or Special Thread Form can be cut more precisely and economically with type "ST" Threading Tools.

We supply *long-life super HSS cutter* blades precision ground to any thread form. To resharpen these cutters only grind top face.

Type "ST" *Spring and Swivel* Threading Tool holders come in 4 sizes to fit any standard toolpost. This is the most dependable Toolholder for cutting a smooth Precision Thread and for easy adjustment of angle of lead.

We also carry a full line of *internal* threading tools.

Agents wanted. Exclusive territories available. Apply in writing or call TA 3-2033 at ASTE SHOW.

Write for free catalog to:

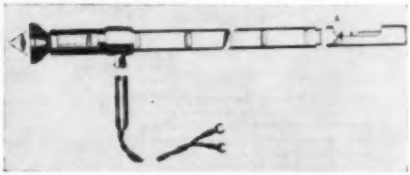
R. B. TOOL CO., Inc.
785 NORTH BROADWAY
WHITE PLAINS, N. Y.

Encircle No. 475 on Card, Opposite Page 65

Simplified cavity inspection

Designed to eliminate costly dismantling and save considerable time in all types of blind inspection, the new Endoscope has recently been offered to the United States market through the exclusive U.S. Agents, Homestrand, Inc., Dept. MG, 9 Addison St., Larchmont, N.Y.

The unit is a precision-built slender tube equipped with self-contained lighting and lenses that transmit a bright, accurate image from point of examination to the eye-piece for direct examination, or to a camera for photographic recording.



The unit is available with a variety of hinged and fixed devices for bottom, rearward, forward and angular viewing and is made in a wide range of sizes. Diameters as small as 3/16" and lengths up to 23 feet.

Use ACTION Card opposite page 64. Encircle No. 10

Module unit to simplify assembly operations

Bathey Mfg. Co., Dept. B, Plymouth, Mich., has announced the addition of a module unit to its line of material handling equipment.

Fabricated of heavy gauge steel, welded joints, with baked enamel finish, the stand measures 14" deep, 28" long and 30" high, and is equipped with a smooth top work area. It has drilled holes to permit grouping into various units with connecting shelves for large or small work areas.

Use ACTION Card opposite page 64. Encircle No. 11

ALL THESE 1/2" DIAMETER

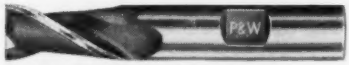


HI-HELIX END MILLS

TWO FLUTE



BALL NOSE TYPE — LIST NO. 360



REGULAR TYPE — LIST NO. 356



LONG (EXTENDED) TYPE — LIST NO. 3561





DOUBLE END TYPE — LIST NO. 357

Available FROM STOCK at STANDARD PRICES

FOUR FLUTE

FOUR FLUTE STYLES - - AVAILABLE IN TWO END TOOTH DESIGNS



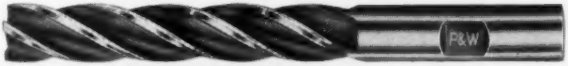
1. CUT-TO-CENTER TYPE . . . preferred for milling jobs requiring radii on the end teeth.



REGULAR TYPE — LIST NO. 358



LONG TYPE — LIST NO. 3581



EXTRA LONG TYPE — LIST NO. 3582



2. CUPPED TYPE . . . preferred for all general milling operations.



DOUBLE END TYPE — LIST NO. 359

SEND THIS COUPON FOR COMPLETE INFORMATION



PRATT & WHITNEY COMPANY
INCORPORATED

22 Charter Oak Blvd., West Hartford 1, Connecticut

Please send my free copy of Circular No. 534.

NAME _____

POSITION _____

COMPANY _____

CO. ADDRESS _____

CITY _____ ZONE ____ STATE _____

Encircle No. 476 on Card, Opposite Page 65

Presses speed up plastics trimming and piercing operations

A line of hydraulic presses for trimming and piercing parts made from vacuum-formed plastic enable operating speeds to match those of the forming equipment.

Presses feature fast ram approach for time-saving closure and return of the movable platen, adjustable stroke control for automatic slow-down before work is contacted, and accurate pressure for maximum job flexibility.

There are five standard models available in capacities from 75 to 300 tons, with platens ranging from 40″x50″ to 60″x80″, and daylight from 22″ to 40″. Dake Corporation, Dept. JS, Grand Haven, Mich.

Use ACTION Card opposite page 64. Encircle No. 12

Mistic Mist

MIST GENERATORS

cool by using the refrigeration principle



- ✓ The simplest of all mist generators uses ordinary shop air pressure.
- ✓ Needs no special coolant, any water soluble oil or wax may be used.
- ✓ Has no pressure tank.
- ✓ Gages, filters and regulators have been eliminated.
- ✓ Cools the very cutting edge of tools.
- ✓ Applies coolant to the tool, not to the chips.
- ✓ Produces finer finishes.
- ✓ Burrs are reduced to a minimum.
- ✓ Increases Tool Life.
- ✓ Reports of from 50 to 100 per cent longer life are not unusual.
- ✓ Increases Production.
- ✓ Increased speeds possible only with mist cooling make unusual production increases.
- ✓ Is applicable to all metal cutting operations.
- ✓ Surprising results are obtained in all milling, drilling, sawing, tapping, turning or grinding operations.
- ✓ Is economical to operate.

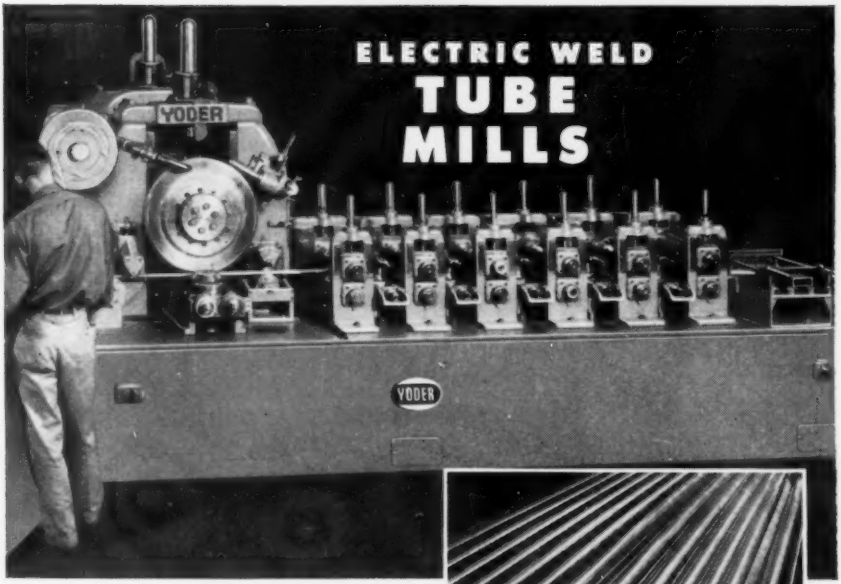
1 gal. of coolant is sufficient to operate 14 hrs. Consumes .50 cu. ft. per min. maximum.

Systems are available for as low as $30.00.

Full details are given in our circular No. T.D. 955 which we will be pleased to send you.

AETNA MFG. CO.
BENSENVILLE, ILLINOIS

Encircle No. 477 on Card, Opposite Page 65



The photo shows the tube forming mill and welder of a complete Yoder mill recently installed for an Italian customer. Although it looks very much like a standard Yoder mill, it embodies special mechanical and electrical innovations designed for *tube production at speeds up to 350 fpm*—from 200 to 300% faster than heretofore considered practical by the resistance-weld process. This is just one example of the many new things introduced by Yoder in pipe and tube making equipment, to meet widely varying production needs. Other recent Yoder developments are induction weld mills for making steel as well as non-ferrous pipe and tubing, at speeds never before approached by this process, and adding greatly to its recognized economic advantages. For more complete information about the latest technological advances in Yoder tube mill equipment, write, wire or phone

THE YODER COMPANY
5509 Walworth Ave., Cleveland 2, Ohio



Literature on Request:

- ☐ **1.** Electric Weld Tube Mills for *Steel Tubes* up to 4" diameter.
- ☐ **2.** *Induction Weld* Tube Mills—sizes up to 8" diameter for aluminum, nickel, copper, brass, inconel, monel, stainless and other alloys.
- ☐ **3.** *Pipe Mills*—electric weld—for sizes up to 24" diameter.

ENGINEERING YODER MANUFACTURING

PIPE AND TUBE MILLS—Electric Weld
ROTARY SLITTING LINES
COLD ROLL FORMING MACHINES

Encircle No. 478 on Card, Opposite Page 65

Great Buys For

VICTOR'S 25TH ANNIVERSARY YEAR



Our special import . . .

DIAMOND WHEEL DRESSERS

Made of selected, full individual stones, mounted in 7/16" diameter x 6" long cold rolled shank.

Karat	Regular Price	Our New Price
¼	$ 6.00	$ 2.85
½	12.00	5.00
¾	21.00	7.50
1	30.00	10.25
1½	54.00	15.00
2	75.00	20.00
2½	102.00	26.00
3	130.00	32.00

These diamonds can be set in any shank to your specifications for $1.00 each extra.

Order today—Immediate Delivery from Stock!

VICTOR

MACHINERY EXCHANGE, INC.

Dealers in Tool Room Equipment

Dept. A, 251 Centre St.

Tel.: CAnal 6-5575 New York 13, N.Y.

Encircle No. 479 on Card, Opposite Page 65

Light, powerful, pneumatic grinder

Cleco Air Tools Div., Reed Roller Bit Co., Dept. BB, Houston, Tex., has announced their new 2000 series pneumatic cup wheel grinder. Cleco has offered to let any factory or plant compare the new grinder to any other similar tool on that factory's air line.

The 2000 lists several design characteristics aimed at permitting the operator to do a faster, yet easier, job, and to increase the grinder's useful life.

Weighing 10½ pounds, without guard, the grinder is only 7-⅝" high, and owes most of its reduced weight to a magnesium housing and redesigned rotor.

The rotor is of ground alloy steel floating on the shaft, eliminating tedious assembly of the motor unit. The cylinder is of high carbon steel with smooth inside surfaces to reduce friction and wear. The air port leads under the rotor blades for quick and positive starting.

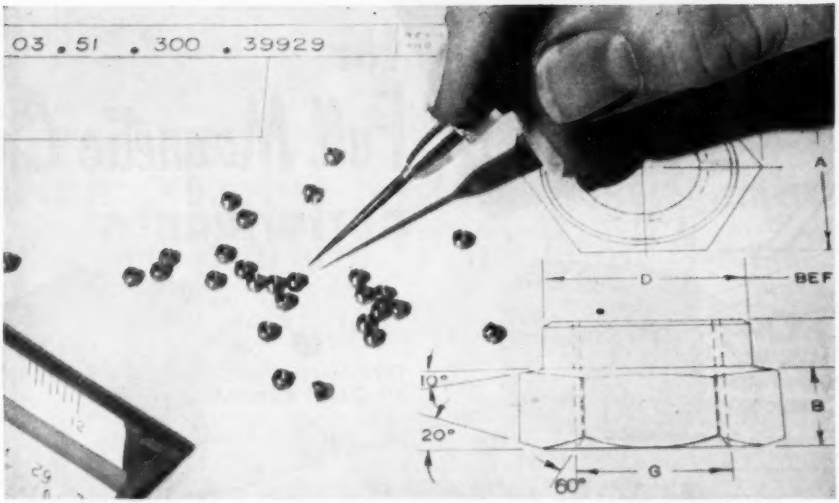
Sealed ball bearings, fixed in the front bearing plate and securely held on the rear shaft, permit a high axial thrust loading.

The Cleco grinder has a large capacity filter screen for the air passage leading over an automatic oiler and oil chamber providing positive lubrication for moving parts, including rotor blades. A leakproof valve system is of a simple type design coupled with an "O" ring.

The governor, with its separate oiler, has a ball type center. It is adjusted through a rotor shaft hole, eliminating the necessity of taking off covers or disassembling the grinder. The shaft hole, fitted only by a special wrench, is closed by a countersunk Bristol screw after adjustment has been made.

The Cleco 2000 can use either the straight type abrasive wheel with the guard attached to the grinder body, or the flanged cup abrasive wheel with the revolving cup guard.

Use ACTION Card opposite page 64. Encircle No. 13



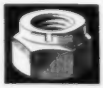
FLEXLOC Micro locknuts meet designers' needs for tiny precision nuts that retain strength and holding power in the smallest assemblies—servomechanisms, electronic and electrical equipment, all miniature devices.

Design Lighter, More Compact Products with New FLEXLOC Micro Nuts

Standard Miniature Locknuts Permit Design Engineers to Develop and Fasten Smaller Assemblies Safely

SIZE	Across Flats		Shoulder Height		Across Corners	Height +.000 −.003
	MAX	MIN	MAX	MIN	MIN	
0-80 NF-3B	.111	.107	.047	.042	.123	.075
1-64 NC-3B	.127	.123	.0635	.0585	.141	.090
1-72 NF-3B	.127	.123	.0635	.0585	.141	.090
2-56 NC-3B	.158	.153	.068	.063	.176	.105
2-64 NF-3B	.158	.153	.068	.063	.176	.105
3-48 NC-3B	.190	.183	.071	.066	.210	.120
3-56 NF-3B	.190	.183	.071	.066	.210	.120
4-40 NC-3B	.190	.183	.072	.067	.210	.120
4-48 NF-3B	.190	.183	.072	.067	.210	.120

Standard FLEXLOC Micros—in sizes ranging from 0-80 to 4-48—are available in brass (either plain or cadmium plated). Consult SPS for miniature nuts of other conventional materials.



New FLEXLOC Micro locknuts are smaller and lighter than regular FLEXLOCS of the same nominal diameter. Wrenches of smaller size are used to install them. Mating joints or flanges can be designed smaller—with no loss in strength or convenience of assembly.

FLEXLOC Micros have all the advantages of larger FLEXLOCS. One-piece, all-metal construction—nothing to put together, come apart, lose or forget. Use them as lock or stop nuts—they stay put anywhere on a threaded member as soon as the locking threads are fully engaged. Uniform locking torques insure accurate preloading. There are no nonmetallic inserts to pop out or deteriorate. Moisture, dryness, oil, temperatures to 250°F won't affect these Micro nuts. Just screw them on. They lock and stay locked. Vibration won't shake them loose.

For complete information on FLEXLOC Micro locknuts, consult your authorized SPS distributor. Or write STANDARD PRESSED STEEL CO., Jenkintown 52, Pa.

FLEXLOC®
LOCKNUT DIVISION

STANDARD PRESSED STEEL CO.
SPS
JENKINTOWN ■ PENNSYLVANIA

Encircle No. 480 on Card, Opposite Page 65

electrical controls for Full Magnetic Chuck performance



A ELECTRO-MAGNETIC CHUCK CONTROL

Releases and demagnetizes work pieces simultaneously. No time lost. No damage to work or chuck face. Protects chuck from voltage surges. Speeds production. Chuck capacities: 50 to 15,000 Watts . . . 60 to 20,000 square inch chuck area.

B ELECTRO-MATIC RECTIFIER

Power conversion Unit, proved for dependable use with Magnetic chucks and other direct current equipment, from 50 Watts to 40 Kilowatts.

C NEUTROLATOR HOLDING POWER REGULATOR AND CHUCK CONTROL

Provides regulation of holding power which permits grinding without shimming, to closer parallelism than ever before possible. In production grinding where holding power must be the same with each work piece, Neutrolator reproduces the same tension on successive pieces without readjustment. Where various tensions are required, a simple dial or push-button control provides regulation of holding power.

D ELECTRO-MATIC A.C. DEMAGNETIZER

Demagnetizes dies, punches, cutters, tools that have been magnetized from any source. Works by simple contact. Operates on standard A.C. voltage. Will not overheat through constant use. A size for every purpose.

The Best Is None Too Good For Your Cutting Tools And Dies

Encircle No. 535 on Card, Opposite Page 65

ELECTRO-MATIC PRODUCTS CO.

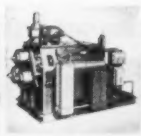
2235-37 N. Knox Ave. Chicago 39, Ill. (U.S.A.)
Telephone: BElmont 5-4010



Horizontal Stroke Friction Saws



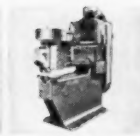
Plate Bending Rolls



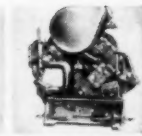
Angle Bending Rolls



Double Angle Shears



Rotary Shears



Combination Shear, Punch & Coper

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In more than 40 cities all over the country, there are Kling distributors who can show you these Kling Metal Working Machines and tell you about the citations they are receiving for production records in "the best of companies."*

Call the distributor nearest you; he will be glad to be of service to you. If in doubt which distributor to contact, write us direct. We will be happy to answer your questions and send Complete Line Bulletin 100.

**Let us send you a list of leading companies in your industry, that are users of Kling Machines.*

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Joseph T. Ryerson & Son, Inc. San Francisco

(Southern)
Harron, Rickard & McCone Company of Southern California, Los Angeles
Joseph T. Ryerson & Son, Inc. Los Angeles

COLORADO
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CONNECTICUT
Joseph T. Ryerson & Son, Inc. Wallingford
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Noland Company, Washington, D. C.

FLORIDA
Farquhar Machinery Co., Jacksonville

GEORGIA
Noland Company, Atlanta

IDAHO
Hallidie Machinery Co., Spokane, Wash.

ILLINOIS (Northern)
Beatty Machinery Co., Chicago
Joseph T. Ryerson & Son, Inc. (Main Office) Chicago
Also at Rock Island & Rockford

(Southern)
Robert R. Stephens Machinery Co. St. Louis, Mo.

INDIANA (Northern)
Joseph T. Ryerson & Son, Inc. South Bend

(Central and Southern)
Marshall & Huschart Mchy. Co., Indianapolis
Joseph T. Ryerson & Son, Inc., Indianapolis

LOUISIANA
Dixie Mill Supply Co., New Orleans

MASSACHUSETTS
Joseph T. Ryerson & Son, Inc. Boston
Wigglesworth Machinery Co., East Boston

MICHIGAN
J. Lee Hackett Company, Detroit
Joseph T. Ryerson & Son, Inc. Detroit

MINNESOTA
Minnesota Steel Supply Co. Minneapolis
Joseph T. Ryerson & Son, Inc. Minneapolis

MISSOURI (Eastern)
Robert R. Stephens Machinery Co. St. Louis
Joseph T. Ryerson & Son, Inc. St. Louis

(Western)
Robert R. Stephens Machinery Co. Kansas City
Joseph T. Ryerson & Son, Inc. Kansas City

NEW JERSEY (Northern)
Joseph T. Ryerson & Son, Inc. Jersey City
Triplex Machine Tool Corp., New York, N. Y.

NEW YORK
Joseph T. Ryerson & Son, Inc. New York, N. Y.
Triplex Machine Tool Corp., New York, N. Y.

(Upstate)
Macaulay Machinery Co., Rochester
Joseph T. Ryerson & Son, Inc. Buffalo, Rochester, Syracuse

NORTH CAROLINA
Armentrout Machinery Co., Greensboro
Joseph T. Ryerson & Son, Inc., Charlotte

OHIO (Northern)
Hackett-Ohio Company, Cleveland
Joseph T. Ryerson & Son, Inc., Cleveland

(Southern)
McBeth Machinery Co., Cincinnati
Joseph T. Ryerson & Son, Inc., Cincinnati

OKLAHOMA
Hart Indust'l Supply Co., Oklahoma City
Industrial Equipment Co., Tulsa
Joseph T. Ryerson & Son, Inc., Tulsa

OREGON
Hallidie Machinery Co., Portland

PENNSYLVANIA (Eastern)
J. A. Carlin Co., Bala-Cynwyd (Phila.) Penna.
Joseph T. Ryerson & Son, Inc. Philadelphia

(Western)
McBeth Machinery Co., Pittsburgh
Joseph T. Ryerson & Son, Inc. Pittsburgh

TENNESSEE
Noland Company, Chattanooga

TEXAS (Northern)
Hamilton Machinery Co., Dallas

(Southern)
Rex Supply Corp., Houston

UTAH
Mine & Smelter Supply Co., Salt Lake City

VIRGINIA
Noland Company, Newport News

WASHINGTON
Dawson Machinery Co., Seattle
Hallidie Machinery Co., Seattle, Spokane, Tacoma
Joseph T. Ryerson & Son, Inc. Seattle, Spokane

WISCONSIN
Joseph T. Ryerson & Son, Inc., Milwaukee
John A. Staley Company, Milwaukee

Since 1892 **Kling BROS. ENGINEERING WORKS**

1320 N. KOSTNER AVE. • CHICAGO 51, ILLINOIS

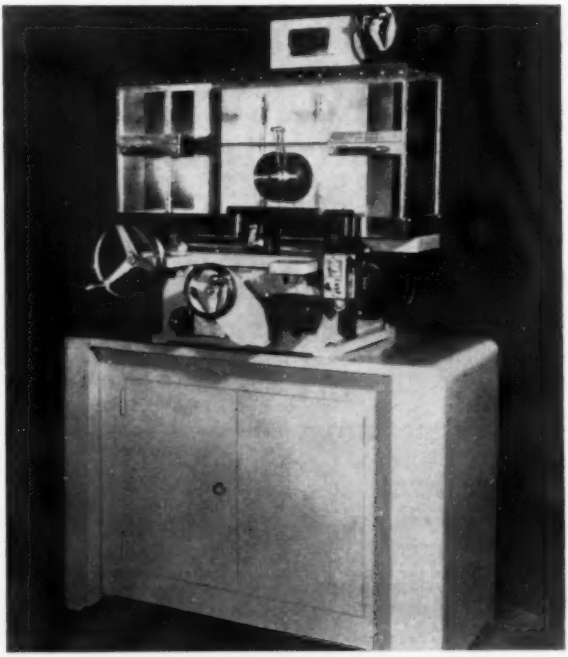
Exclusive Canadian Distributor: Brown-Boggs Foundry & Machine Co. Ltd., Hamilton, Ont.

Export Distributor: Simmons Machine Tool Corp. 50 E. 42nd Street, New York 17, N. Y.

1177MMR

Encircle No. 481 on Card, Opposite Page 65

Fully Automatic Machine for Slicing and Dicing



Micromech Mfg. Corp., Dept. RS, 1020 Commerce Ave., Union, N.J., recently organized by the management of Sanford Mfg. Corp., manufacturers of the Sanford Grinder line, has announced an entirely new and fully automatic machine for slicing and dicing Germanium, Silicon and Quartz.

The machine, known as "Micro-Matic Precision Wafering Machine", is designed and manufactured specifically for use by the electronic industry in the processing of the above materials used in Transistor and Diodes manufacture.

It is equipped with control mechanisms and other automatic devices, together with inbuilt accuracy which will allow it to perform the functions of wafering and dicing semi-conductor materials.

The wafers produced are consistent in thickness, and parallelism is controlled to within several ten thousandths variation. Any predetermined thickness may be obtained, ranging from .010 to .225. A 4, 5, or 6 inch diamond impregnated metal saw may be used for slicing and dicing.

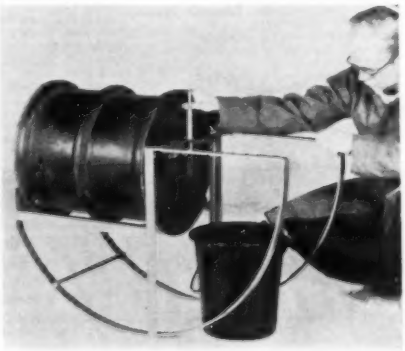
The working capacity of the machine is 6" transverse, 12" longitudinal, and up to 12" vertical.

The machine is supplied complete with motors, controls, and other requisite mechanisms, together with stainless steel splash pan and lucite splash enclosure, coolant facilities, and an integral base housing the coolant tank and automatic control panel.

Use ACTION Card opposite page 64. Encircle No. 15

New tilter for rubber drums

New Figure 522 Tilter, especially designed for pouring from the rubber drums used for chemicals and solvents,





"90 FS" Automatic Universal FLUTE GRINDER

Grinds spiral flutes from solid in tools

SUCH AS—

- **Drills - down to 1/16" diameter**
- **Spiral or straight taper reamers**
- **Milling cutters and End Mills**

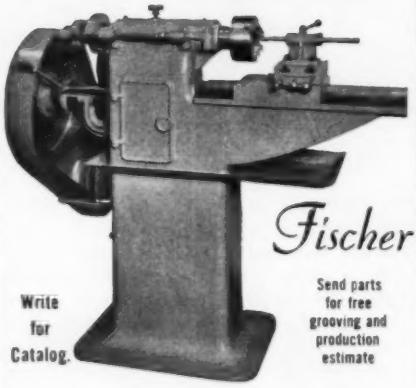
Sharpens Saws up to 12" diameter and in gangs up to 7¾" long. Also can be adapted to do other special work. No special skill required to operate.

SAVE TIME AND MONEY WITH WARDWELL "90 FS." Write for bulletin No. "90 FS."

Maker of largest line of saw and tool sharpening machines.

WARDWELL MANUFACTURING CO.
3807 Ridge Rd., Cleveland 9, O.

Encircle No. 482 on Card, Opposite Page 65



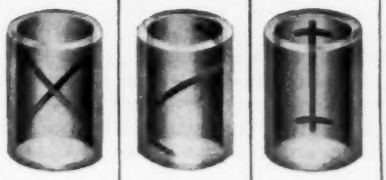
Fischer

Write for Catalog.

Send parts for free grooving and production estimate

ESTABLISHED 1900

FISCHER MACHINE CO.
ELEVENTH & WOOD STS. • PHILADELPHIA 7, PA.



. . . OIL GROOVERS

The FISCHER No. 1 Oil Groover cuts a wide variety of grooves in bearings up to 8" in length and up to 5" inside diameter. A few simple settings permit you to cut continuous, relieved, straight or spiral grooves at any angle from parallel to perpendicular to the work. Grooves may also be cut in shafts, housings, etc. This machine will slash grooving time and deliver continuous profitable production in your shop. It will pay to find out what it can do on your grooving jobs.

Encircle No. 483 on Card, Opposite Page 65

has been announced by Nutting Truck and Caster Co., Dept. RB, 1201 W. Division St., Faribault, Minn.

Easy to load, this tilter saves time and effort and, because of controlled pouring, eliminates spillage and waste. It is light weight, portable and requires little floor space. Non-slip clamp securely holds the drum.

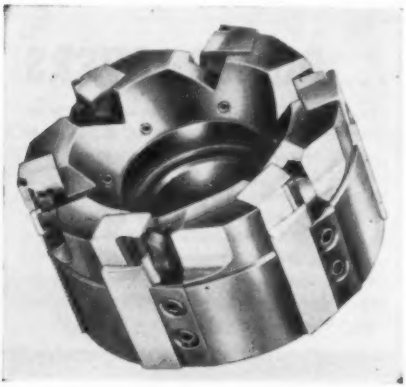
Life time electrically welded construction, with overall width - 16-¾"; overall length - 38-¼"; and approximate weight - 38 lbs. Standard Figure 522 fits the 13 gallon capacity drums (17-¼" diam. x 20-½" high), but can be furnished for other size drums.

Use ACTION Card opposite page 64. Encircle No. 16

Face mill body eliminates insert regrinding

A new Lifetime face mill body which accommodates industry standard holders and throw away carbide inserts to completely eliminate regrinding has been introduced by the Nelco Tool Co., Inc., Dept. MG, Manchester, Conn.

The body is precision engineered with built-in adjustments to accommodate standard tool bits with disposable carbide blanks; each blank having six engineered cutting edges which can be changed in seconds. With this new cutter, downtime is reduced from hours or days to minutes.



The carbide cutting blanks are industry standard and are available from any carbide manufacturer. A turn of a socket wrench and a new cutting edge is in place, automatically aligned to run and cut true.

Use ACTION Card opposite page 64. Encircle No. 17

Wheel truing device

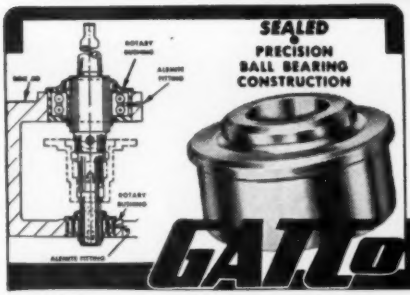
A new grinding wheel truing device, called the Little Speedy, has been designed and manufactured by Palmer Mfg. Co., and is being distributed by M. E. Neuber Industrial Diamond Co., Dept. JP, 791 Tremont St., Boston 18, Mass.



This device for regular, everyday truing and wheel conditicning is cast from Meehanite, and Endurion plated. It is rigid, yet flexible and versatile, and always perfectly positioned on any magnetic chuck. It is claimed to eliminate setup changes and save dressing and truing time. It uses one diamond nib for face or side conditioning of the wheel.

The overall height is 4⅝ inches and the width is 2⅝ inches. Base is 2½x2⅛ inches. Range of height adjustment of diamcnd is 4 inches.

Use ACTION Card opposite page 64. Encircle No. 18



ROTARY BUSHINGS

FOR DRILLING, CORE DRILLING ROUGH AND FINISHED BORING

The inner race of the GATCO bushing rotates with the tool, piloting and tool accurately below or above the work—or both.

Eliminates expensive tool construction—Reduces tool wear—Prevents seizure and pilot breakage—Especially adapted where precision is required.

Write for full information and prices

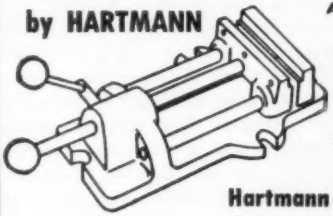
ROTARY BUSHINGS

42326 ANN ARBOR ROAD, U.S. 12, PLYMOUTH, MICH.
Telephone PLYMOUTH 1472

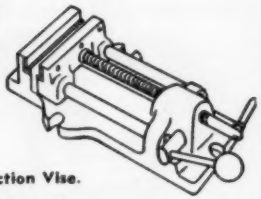
Encircle No. 484 on Card, Opposite Page 65

INSTANT ACTION **RAPIDSET**

by HARTMANN



All Purpose Tool Room and Machine Shop Vises.



The

JAWSET

Adjustable Pressure Production Vise.

For Information Write Dept. M

Hartmann Mfg. Co., 1637 Goold St., Racine, Wisconsin

Encircle No. 485 on Card, Opposite Page 65



SPELLMACO "SPOTTERS"

A matched set of transfer punches for toolmakers, machinists & tool cribs

Used for transferring location of threaded, drilled and reamed holes, slugs, blanks, etc.

Precision made of finest tool steel—Carefully heat treated and tempered for long life—.0025 undersize to facilitate use—Black oxide finish.

SET #3-17; 28 punches with indexed stand—sizes 3/32" to 1/2", by 1/64"—plus handy 17/64" size. Length 4 7/8". ONLY $16.80.

Single sizes available

R. L. SPELLMAN CO. — URBANA, OHIO

Encircle No. 486 on Card, Opposite Page 65

Our large, planned stocks of **Punches & Dies** mean savings for you.



For years we have been following a systematic plan of increasing our stocks of standard punches and dies that benefits you two ways:

(1) The punches and dies you need are READY and waiting WHEN YOU NEED THEM.

(2) Because standards are made in large quantities, PRICES ARE SURPRISINGLY LOW—quality of the highest.

68 years of experience goes into every Lewthwaite tool—and it shows!

CATALOG SHEETS ON REQUEST.

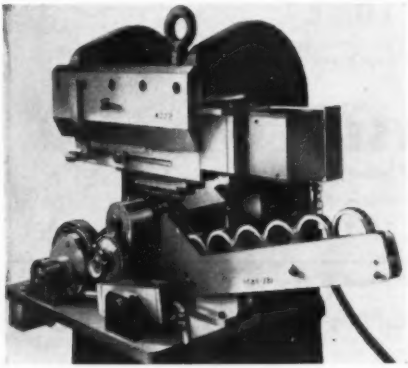
T. H. LEWTHWAITE MACHINE CO.

312 East 47th St., New York 17, N.Y.

Encircle No. 487 on Card, Opposite Page 65

Automatic bearing race marking machine

This new marking machine is designed to roll identification on peripheries of bearing races at the rate of 1500 to 2500 per hour. Parts are fed to the chute from turret lathe and are picked up and placed upon arbor which eliminates distortion during marking operation. Arbor recedes, dropping piece into discharge chute.



The cycle is timed by Geneva motion, actuated by hydraulic system. This perfect timing prevents jams at marking station.

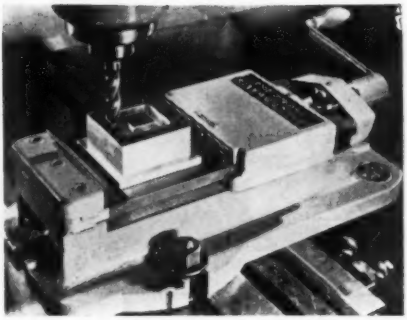
This is only one example of automatic marking equipment designed and built by Geo. T. Schmidt, Inc., 1802 Belle Plaine Ave. Chicago, Ill.

Since all components requiring marking vary in size and shape, these units are built to order only. The company maintains a competent staff of trained field men who are available at no expense to customer.

Use ACTION Card opposite page 64. Encircle No. 19

Milling machine vise

Illinois Metal Products, Dept. RB, 429 W. Superior St., Chicago 10, Ill., has



announced a new precision milling machine tool, known as the IMP Hold-Down vise. IMP'S automatic pull-down jaws grip the work ⅛" from the bottom. This permits easy milling of the sides to the ⅛" shoulder. The operator needs only to place the work-piece on the base of the vise and tighten by hand. No parallels are required, and it is not necessary to hammer the work to seat it. Jaws may be readily revolved for easy cleaning, or replaced with special jaws for irregular work, by the removal of the hinge pin. The standard vise opening is 4". However, a stretching block may be purchased to give the vise a full 6" capacity. A swivel base is also optional equipment.

The clamping feature is fast, safe, and accurate. No time is wasted in searching for parallels. Work is locked rigidly to the base by the over-riding action of the jaws, permitting closer tolerances to be maintained.

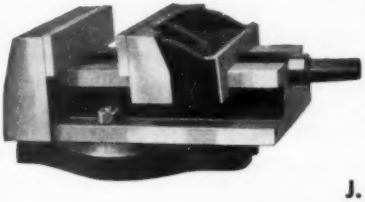
Use ACTION Card opposite page 64. Encircle No. 20

GERMAN PRECISION CIRCLE DIVIDER unknown in USA.

Used to divide a circle into any number of equal parts, no mathematics or charts required. Especially used in layout work. The instrument is made of steel, nickelplated. Price $6.95 with case. Order by mail from importer.

KURT EICHHOLZ
509 ONEIDA ST. JOLIET, ILL.

PLUNKET IMPROVED VISES



We make a complete line of modern vises for drill presses, shapers, milling machines and grinders. Illustration shows our standard milling machine vise as regularly furnished and stocked.

In ordering this vise give size of slot in table:
No. 10—6" jaws, 1½" deep, opens 5"
wt. 45 lbs. .....$ 90.00
No. 20—10" Jaws, 2¼" deep, opens 8½"
wt. 120 lbs. $122.00

Best material and workmanship. Prices are net f. o. b. Chicago *Dealers' inquiries are solicited.*

Write for folder TODAY

J. E. Plunket Machine Co. 3230-32 Archer Ave. Chicago 8, Ill.

Encircle No. 488 on Card, Opposite Page 65



BUSHING BONDING CEMENT

FOR RETAINING DRILL JIG BUSHINGS
USE B-K 7# CEMENT

No distortion of the jig plate or misalignment of the hole pattern. Eliminates lapping of press fit bushings after assembly. Not affected by drilling heat. Bushings can be retained in steel, aluminum or fiberglas jigs. Easily applied by untrained personnel. Especially recommended for use in "master tooling" operations.

Dealer Inquiries Invited



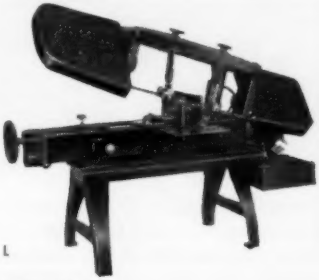
SHERIDAN PRODUCTS
1054 E. Hyde Park Blvd. Inglewood 3, California

Encircle No. 489 on Card, Opposite Page 65

For BIG Savings at LITTLE Cost

Variable Speed Drive - Standard Equipment

MODEL L—The economy, hinge-type saw in our line 9" x 16" capacity. One-piece welded frame lowers hydraulically. Easy blade adjustment for proper cutting. Quick blade change from top of machine. Special precision guides for longer blade life. Floor space only 20"x66".

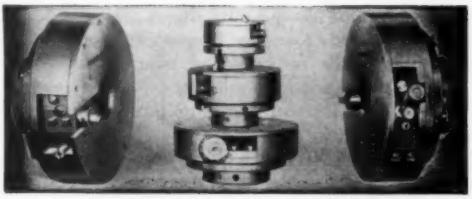


MODEL L

Send for FREE CATALOG. Dept. B

W. F. Wells and Sons
Metal Cutting Band Saws
THREE RIVERS MICHIGAN

Encircle No. 490 on Card, Opposite Page 65



MUMMERT-DIXON

FACING HEADS

with Automatic Feed

One-way Tool Feed — 6, 9 and 12" sizes.

Two-way Tool Feed — 9, 12, 16, 20, 24, 30, 36, 40 and 46" sizes.

Save many costly set-ups.

Bulletin No. 4141 Gives Full Details

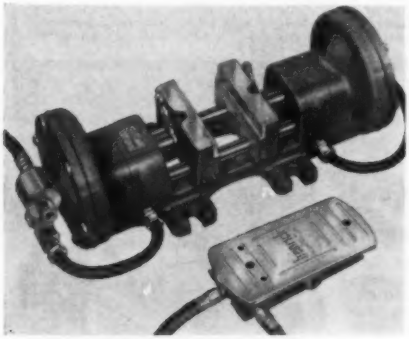
MUMMERT-DIXON CO., 122 Philadelphia St., Hanover, Pa.

Encircle No. 491 on Card, Opposite Page 65

Self-centering air vise for automatically centering parts

New Heinrich model 2 self-centering air vise is designed for holding parts varying in size or shape when the work requires the location of a center or other pre-determined point.

Used in a wide range of machining operations, the model 22 finds work piece center or other point in this way. Each of the two opposing jaws is actuated directly by an air cylinder on both sides of the vise. The movement of the jaws is synchronized within a tolerance of .001" by a gear and rack



concealed within the body casting. This mechanism is fully protected from dirt, chips and coolant. No pressure is transmitted through the centering mechanism. It serves only to guarantee uniformity of jaw travel.

Air cylinders are constructed of sturdy die-cast aluminum with long-lasting "neoprene" diaphragms completely enclosed. Body castings are semi-steel. Wide clearance design between jaws permits drilling clear through without interference. The four-inch wide vise jaws have a maximum travel of 3/8" for each jaw, for a total of 3/4" for both. Vise jaws are infinitely adjustable to 4-1/8" opening.

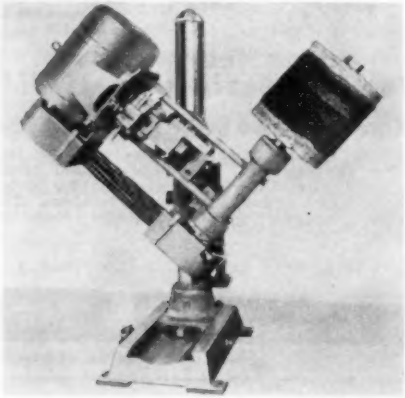
Model 22 holding power on the work is the total pressure exerted by both cylinders. This amounts to 15 time air line pressure for each cylinder, or approximately 3,000 lbs., at 100 psi. Heinrich Tools, Inc., Dept. RB, Racine, Wis.

Use ACTION Card opposite page 64. Encircle No. 21

Wide face polisher

The Murray-Way Corp., Dept. JS, Box 180, Birmingham, Mich. has announced the development of a new wide face polishing wheel known as the No. 53. This new polisher with built in Murray-Way floating action will handle widths up to 24".

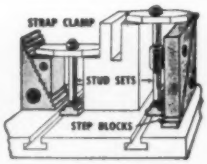
The Floating Action gives an even buffing and polishing on the entire surface. It simplifies the positioning of the work piece and once the proper pressure is established hundreds of pieces can be uniformly processed.



The No. 53 cuts down the number of heads necessary to process work pieces, greatly reduces the number of passes needed to polish the work piece and gives the ultimate in positioning flexibility.

This new wide face polishing wheel is available in two models; the No. 53 heavy-duty; and the No. 54 which is 1/4 smaller in size than the No. 53.

Use ACTION Card opposite page 64. Encircle No. 22



SURE GRIP STEP BLOCKS

Clamping tools of all types

Write for free tracing templates

TIETZMANN TOOL CORP.

Dept. C. T. **Englewood, Ohio**

Encircle No. 492 on Card, Opposite Page 65

ALL in ONE TOOLHEAD



BORING
FACING
TURNING
GROOVING
UNDER-CUTTING

SIX SIZES AVAILABLE



All Have Power Feed for Facing

Write today for complete details.

CHANDLER TOOL CO.
Muncie, Indiana **Model "D"**

COMBINED BORING & FACING TOOL HEADS
Chandler-Duplex

Encircle No. 493 on Card, Opposite Page 65

METAL PRODUCTION CAPACITY AVAILABLE

For long or short production runs of large or small parts, tools, jigs or fixtures. Also dies, gages, special machinery.

Keller Profilometer-Duplicator, 16"x24"
Presses up to 450-ton, 48"x48", Triple Action
Planers up to 20-foot Stroke, 72"x72"
Radial Drill Presses up to 8-foot, 19" column
Lathes up to 158" e.c., 57½" gap, 40" swing
Boring Mills up to 120" Bed, 90" Horizontal, 60" Vertical

Also Milling Machines, Grinders, etc. Complete production facilities — experienced machinists.

INQUIRIES INVITED ON CONTRACT BASIS OR INDIVIDUAL QUOTATION

PIVOT PUNCH & DIE CORPORATION
Dept. MT
NORTH TONAWANDA, N. Y.
Phone JA. 1200

Encircle No. 494 on Card, Opposite Page 65

OPEN — CLOSED — **Plain Type** — TRADE AUTOM MARK — **Offset Type** — CLOSED — OPEN

CONTINUOUS HINGES

All hinges shown can be furnished with special holes, cutouts and bends to blue-print in metals to suit the job.

THREE-FOURTHS OFFSET

AUTO MOULDING & MFG. CO.
1110 E. 87TH ST.
CHICAGO 19, ILL.

SPECIFICATIONS
Open width 7/8" to 6"
Gage Material .040 to .125
Pin Diameter .101 to 3/8
Lengths to 120"

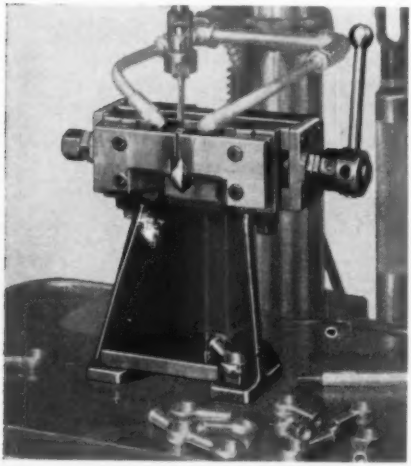
SEMI-OFFSET

Encircle No. 495 on Card, Opposite Page 65

Quick, accurate work-holding jig

An automatically self-centering work holding device, called the John's Drill Jig, has two moving master jaws that work on a right and left hand Acme thread, that allows them to come to the same distance from center every time. The self-centering action will hold within .0015" or better.

It will provide a common base with quick clamping means for countless combinations of drill jigs on such operations as drilling, tapping, reaming, centering, milling, boring, grinding and assembly.



It is said to give precise, split-second centering, rigid clamping of work, fast chucking, visibility and adequate chip room, and great economy on short or long runs.

The John's Jig is ideal for precision cross or end drilling of round, hexagon, or square stock, or standard or odd shaped smooth or rough castings, from ⅛" to 8" OD.

It can also be used as a milling vise where the self-centering feature would be an advantage. It is also suitable for drilling and tapping.

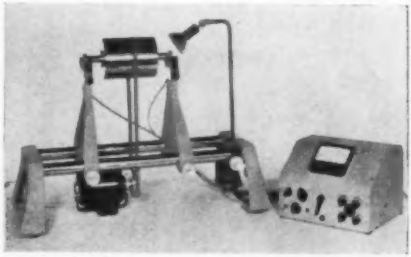
Standard removable slip fit bushings and holders are available to drill center or mean-off-center holes from No. 60 to 1-1/32" drill. Special bushing holders for multi-drill operations easily tooled.

Available in three sizes 6", 8", 14", jaw openings, 2", 4¼", 7½". Bases are available for mounting the jig from 1" to 18" off the working surface. Heuser Manufacturing Co., Dept. RB, 1638 N. Paulina St., Chicago 22, Ill.

Use ACTION Card opposite page 64. Encircle No. 23

New dynamic balancer features simplicity, low cost

A fully electronic dynamic balancer that will handle any rotating body from 4-oz. to 100-lbs., yet is so simple to operate that anyone can learn to use it in less than an hour, has been announced by Micro Balancing, Inc., Dept. MG, Herricks Rd., Garden City Park, N.Y.



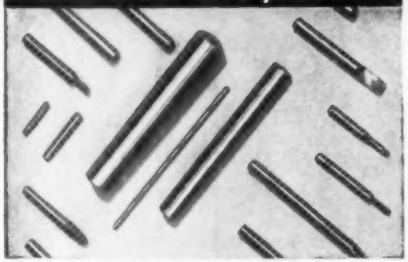
The new unit is a bench model that needs very little space and a minimum of fixturization, making it physically and economically desirable for the manufacturer and service shop to own such equipment outright.

Within its weight handling range, it will balance fans, armatures, blowers, pulleys, crankshafts, drums, propellers and impellers and any other rotating body up to a maximum diameter of 20 inches.

The balancer is designated as the model SU-6, and incorporates many other features and specifications described in a four page bulletin available from the manufacturer.

Use ACTION Card opposite page 64. Encircle No. 24

Peaslee
DOWELS, PINS, SHAFTS, ETC.



Specializing in Stainless Steel
Standard and Made to Order Precision Parts
Send Your Blueprints for Prompt Quotations

PEASLEE METAL PRODUCTS CO.
470 Tolland St.
EAST HARTFORD, CONN.

Encircle No. 496 on Card, Opposite Page 65

Heavy Duty Bench Type
ALLEN PUNCH PRESSES

Many Popular Models
½ to 5 ton capacities
Fully guaranteed



Moderate in price
Model B-2
2 ton
$97.50
Tilting Model
$127.50
less motor

POWERFUL
DEPENDABLE
ECONOMICAL

See Your Supply Dealer
or write for FREE punch press catalog, showing complete line, with information, specifications and prices.

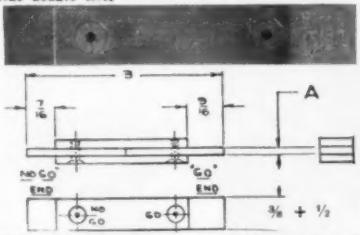
ALVA ALLEN INDUSTRIES
Dept. MTB Clinton, Missouri

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SCHAEFER $12.50

Standard Reversible Width Gage Blanks (flat plug gages)

Use Schaefer Standard reversible width gages to replace custom designed gages for lower first cost plus double life.



Tool Steel Ends hardness Rc 65. Gaging surfaces ground finish. Handles sand blast finish.

A—MADE IN 30 SIZES

Gage ends reversible when worn. "No Go" gage end may be ground to "go" gage end when both gaging surfaces are worn. Replacement ends are readily available from stock.
Also mfr. of standard flush pin blocks and standard built-up snap gage blanks.

WRITE FOR FULL LITERATURE

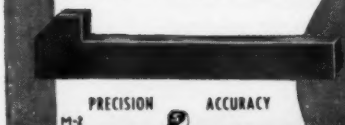
SCHAEFER GAGES
39 Hale Street Ext. Rockville, Conn.

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STEEL
Stanho
PRODUCTS

MACHINE KEYS
ALL TYPES

Woodruff Keys Machine Rack
Taper Pins • Straight Pins
Cotter Pins and Other
"Stanho" Steel Products



PRECISION ACCURACY
M-2

STANDARD
HORSE NAIL CORP.
NEW BRIGHTON, PA

Encircle No. 499 on Card, Opposite Page 65

Portable dust collecting and shop cleaning system

Craftools, Inc., Dept. MG, 401 Broadway, New York 13, N.Y., has announced the new Craftool Dustman, a portable dust collecting and shop cleaning unit designed for the small industrial and school woodworking shop.

It is a powerful, portable, self-contained dust collecting system that uses any standard garbage or ash can as its waste receptacle. When the can is full just remove the Dustman unit and empty.

The unit draws in the sawdust or dirt through the standard hood and 2½" diameter hose. The suction is created by a powerful specially designed 8" pressure type blower; the same type unit that is used in industrial plants for conveying material. The sawdust or waste is drawn through the blower and deposited in the garbage or waste can. The free air is permitted to escape through a filter bag located on the top



of the machine. There are no internal filters that can clog or cut down the efficiency of the machine.

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Visit Our Booth 175—ASTE Convention—Chicago March 19-23



ACE DRILL BUSHING CO., INC.
5407 Fountain Ave., Los Angeles 29, Calif.

Write for Catalog D

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DON'T MISS THE VERSATILE BARKER BENCH MILL IN OPERATION

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A.S.T.E. Show Chicago Booth 731



$295.00 As Shown

Screw Feeds Optional at Extra Cost.

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BARKER ENGINEERING COMPANY

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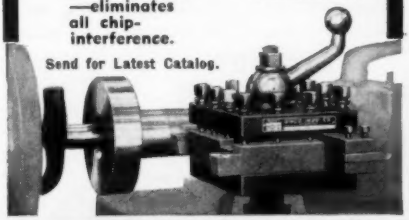
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ENCO TURRETS Cut Lathe Costs!

SEE THEM - BOOTH 651 - ASTE SHOW

✓ Accurate within .0005.
✓ 12-position indexing.
✓ Indexing is self-contained —eliminates all chip-interference.
✓ Hardened steel construction.

Send for Latest Catalog.



ENCO Manufacturing Co., Dept. 236
4524 W. Fullerton Ave., Chicago 39, Ill.

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Here's the dope!



WRITE for SAMPLE

DRYS FAST-RESISTS OIL
WON'T CHIP, CRACK OR FLAKE OFF!

Encircle No. 503 on Card, Opposite Page 65



Handle your small part precision JIG BORING on the LINLEY JIG BORER

Why tie up your big, costly jig borers on small work when you can get maximum utility at less cost per hour on a machine exactly fitted to your work. Put your small work on the LINLEY where it belongs and reserve your large machines for large work, where large work belongs. You'll save money this way.

SPECIFICATIONS:
Table Movement: 6"x10"
Table Size: 7"x17½"

Complete details sent promptly on request

LINLEY BROTHERS CO.
State St. Ext. Bridgeport 1, Conn.

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READING BENCH KEYSEATER



Portable — move directly to job; a time saver for both small and large shops.

3¾" stroke; adaptable for other work.

Low first cost, prompt delivery. Good dealers wanted.

Reading Machine Co.
Cincinnati 37, Ohio

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NEW NESTING TYPE TOTE PANS



Sturdy 16 ga. metal. 20" long x 12" wide x 6¼" deep. Drag holes and handles at both ends.

J. L. LUCAS & SON, INC.
Bridgeport 5, Conn.

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SAVE 90% CHECKING TIME

When Building Dies

This new method of checking tapers on dies does away with die squares and height gauges.

Write for complete details.



Tietzmann Tool Corp.
D.C. 1 Englewood, Ohio

Encircle No. 507 on Card, Opposite Page 65

CAM MILLING

Fully equipped modern machine shop with extensive **Jig Boring, Surface Grinding, Horizontal Boring** and **Thread Grinding** facilities as well as modern **Cam Milling** and **Cam Grinding** equipment.

Your Inquiries Answered Promptly

HIMOFF MACHINE CO., INC.
23-22 44th Road Long Island City 1, N. Y.

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TEMPERATURES AT A GLANCE!

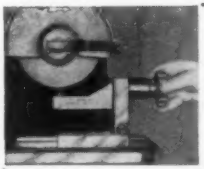


PYRO SURFACE PYROMETER

Quick acting, light-weight and rugged.—unsurpassed in accuracy. Large direct reading scale, automatic cold-end compensator, shielded steel housing. Wide selection of thermocouples and extension arms. Five standard ranges: 0-300°F to 0-1200°F; also special and sub-zero ranges. Write for free Catalog No. 168

THE PYROMETER INSTRUMENT CO.
Bergenfield 3, New Jersey

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New 1956 Model "SS"

RADIUS DRESSER

Outperforms them all

Cut production time without sacrificing accuracy! Easy to set, easy to see, eliminates necessity of guard removal. Somerset Radius Dresser turns "tricky" jobs into routine operations. Write for free illustrated folder.

At new low price $124.50 with diamond

SOMERSET TOOL CO. 244 Virginia St. Hillside, N. J.

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CAMS

To Your Specifications except Screw Machine Cams

Design Assistance Offered

KIDDE PRECISION TOOL CORP.
23 LOCUST AVE. ROSELAND, N.J.

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TRUE POINT DRILL SHARPENER

for Drills 41 - 60 and 61 - 80 R.H. & L.H.

A properly sharpened drill cuts faster — more accurately and is less likely to break.

Write for circular and full details.

UP-TO-DATE TOOL CO.
Dept. B-10
P. O. Box Station A Worcester 8, Mass.

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Polishing kit for deburring, smoothing & polishing

So that manufacturers can test and demonstrate Cratex rubberized abrasives on actual deburring, smoothing and polishing operations, Cratex has just developed a comprehensive, yet, inexpensive polishing kit.



This kit contains an assortment of 24 of the most popular Cratex polishing wheels, cones, blocks and mandrels which are in wide use in industry; for cleaning and polishing molds, dies and castings; removing film, coatings and enamel; blending in and polishing welded seams after rough grinding; cleaning and polishing commutators and contact points; polishing bearing surfaces and raceways; and removing rust, heat marks, tarnish, excess solder, scratches and corrosion. Cratex Mfg. Co., Dept. KE, 81 Natoma St., San Francisco 5, Calif.

Use ACTION Card opposite page 64. Encircle No. 26

When writing advertisers, please mention MACHINE and TOOL BLUE BOOK



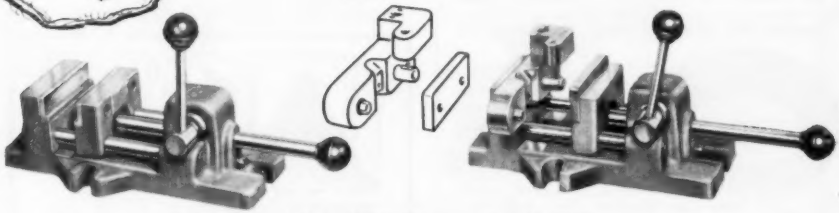
A Simple Formula for Solving Tooling Problems

A + B = C

No need to start from scratch . . . use the HEINRICH Grip-Master Jig and Fixture base . . .

Simply add false jaws and bushing plate.

Result . . . an accurate, low-cost Drill Jig.



See Us at the ASTE Show—Booth 788

Write for Free Catalog

HEINRICH TOOLS, Inc. Dept. 106-C Racine, Wis.

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HAND KNOBS

6 Sizes Cast-Iron

Tapped, Reamed or Blank

Hex-shaped hub for extra tightening

Write for catalog

TIETZMANN TOOL CORPORATION

DEPT. H-K ENGLEWOOD, OHIO

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GEARS

In Stock—Immediate Delivery

Gears, speed reducers, sprockets, thrust bearings, flexible couplings, pulleys, etc. A complete line is carried in our Chicago stock. Can also quote on special gears of any kind. Send in your blueprints and inquiries.

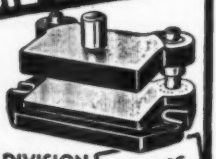
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CHICAGO GEAR WORKS

440-50 N. Oakley Blvd., Chicago 12, Ill.

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DANNEMAN Precision DIE-SETS



Precision-Bored on Master Plates

DANNEMAN DIE-SET DIVISION
ACME-DANNEMAN COMPANY, Inc.
201 Lafayette St. New York 12, N. Y.

CATALOG ON REQUEST

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MINIATURE

DRILL BUSHINGS

Hole Sizes—No. 80 to 3/32"
O.D. 3/32" to 13/64"
Lengths ¼" to ¾"
.0002 Tolerance on I.D., O.D., and Concentricity

WRITE FOR CATALOG

PREBCO BUSHING CO.
14702 East Arrow Highway
Baldwin Park, California

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JIG BORING

and

Large Precision Machining
Done to your specifications

WE HAVE 13 JIG BORERS

KIDDE PRECISION TOOL CORP.
25 LOCUST AVE. ROSELAND, N.J.

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MAKE HARDNESS TESTS
With The
KING PORTABLE BRINELL

Puts a load of 3000 kg. on a 10 mm ball. Can be used in any position — even upside down. Removable test head for testing very large parts. Guaranteed to make accurate Brinell tests. Throat: 4", gap 10", wt. 26 lb.



KING TESTER CORP.
142 N. 13th Phila. 23, Pa.

Encircle No. 519 on Card, Opposite Page 65



"Jorgensen" and "Pony"

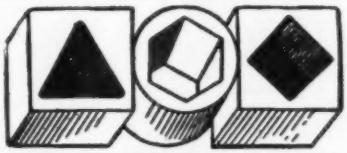
CLAMPS

Ask Your Supplier

send for free 32-page catalog

the clamp folks / **ADJUSTABLE CLAMP CO.**
403 N. Ashland, Chicago 22, Ill.

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DRILL THESE HOLES

BY A QUICK, EASY, INEXPENSIVE METHOD
Your business letterhead will bring literature

WATTS BROS. TOOL WORKS
Wilmerding, Pa.

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UNIVERSAL DIVIDING HEADS



Precision built to meet every requirement, Carroll Dividing Heads are the accepted standard in metal-working plants from coast to coast.
A unique optional swivel base makes possible speedy and accurate work settings to compound angles. This and other features convert a conventional Dividing Head into a Universal Work Head or Rotary Table.

Write for 8 page catalog giving complete details, etc.

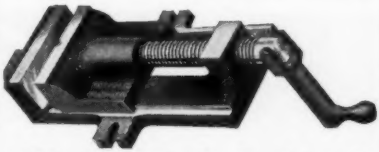


10" - 12" Universal Right or Left Hand Dividing Heads with or without Direct Indexing.

CARROLL DIVIDING HEAD CO.
3525 Cardiff Ave. • Cincinnati 9, Ohio

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YOST DRILL PRESS VISE



This new Yost vise has been designed expressly for use on drill press operations. Does away with special and costly jig fixtures.

Offered in two sizes.

Vise No.	Width of Jaw, Inches	Opens Inches	Weight Pounds
1D	3½	4	12½
2D	5	5½	23

Do you need a vise of ANY type?

Write today for bulletins on the extensive Yost line

YOST MFG. COMPANY
124 GRANT STREET
CAMBRIDGE SPRINGS, PA.

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WALLS TU-WAY BELT SANDER

USE IT EITHER WAY



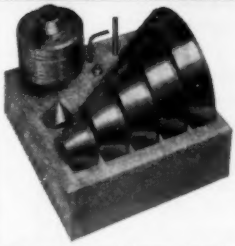
At last, a top quality industrial sander that provides all the most wanted features – yet sells for so little. *$89.95* complete with cord, plug, switch ready to use

Illustrated Literature on Request
A few desirable distributor territories still available.

WALLS SALES CORPORATION
333 Nassau Avenue Brooklyn 22, N. Y.

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SAVE SET-UP TIME



with
REPCO LIVE CENTER SET

Set consists of heavy duty live center plus 6 interchangeable adapters from a point to 6¼" dia. bell. Saves costly set-up and machining time often needed to make special, large diameter centers.

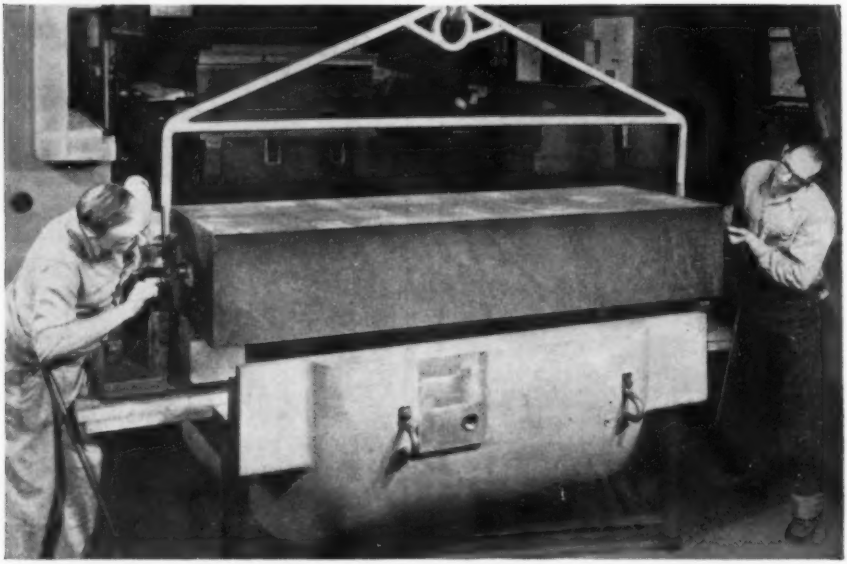
SIZES: 3 to 5 M. T. B&S, Jarno, and Straight Shanks available. Female and special centers on request.

WRITE FOR BULLETIN NO. 101
DEALER INQUIRIES INVITED

ROCKFORD ENGINEERED PRODUCTS CO.
2324 23rd Avenue • Rockford, Illinois

Encircle No. 525 on Card, Opposite Page 65

Square Edge Granite Surface Plates



The development of diabase (black granite) surface plates, with one or more edges precision finished square with the top surface, has been announced by Rahn Granite Surface Plate Co., 639 N. Western Ave., Dayton 7, O.

The photograph shows a 28" x 84" x 14" plate being used to spot the rails of a universal vertical grinder at Springfield Machine & Tool Co., Springfield, Ohio. The 28" x 84" surface, which spots the rear of top and bottom rails,

SAVE YOUR TAPS!

ARMITE

TAP-TOOL

(A) Super-sensitive tapping head for high speed tapping of 0-80 to 4-40 holes in steel. Taps 00 holes by special factory adjustment. Fits standard drill press. Morse #2 tapered shank.

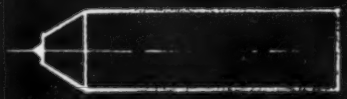
(B) Lock screw engages overload clutch for #2 to #4 taps. Finger-tip sensitive control provides maximum "feel" of tap operation. Control collar held lightly by operator. Downward pressure drives tap into work. Upward pressure instantly reverses it. Request descriptive literature.



ARMITE LABORATORIES
6609 Bread St., Los Angeles 1, Calif.

Encircle No. 526 on Card, Opposite Page 65

DIAMOND DRESSERS
for THREAD GRINDERS
Guaranteed Tolerances $2.50



Complete line of
Diamond Wheels and Tools
ALLSTATE DIAMOND PRODUCTS
80-82 Bowery CA 6-2560 N. Y. 13, N.Y.

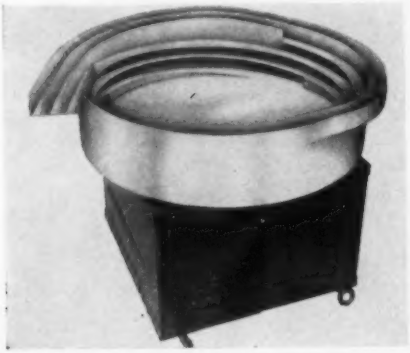
Encircle No. 527 on Card, Opposite Page 65

has been precision lapped uniformly convex to a maximum tolerance of .0003" at the center. The two diagonals of the plate are the same within .0001"; thus insuring that there will be no twist on the grinder head in operation. The 14" x 84" edge has been precision lapped uniformly concave, with the maximum tolerance of .0003" at the center of the 84" length, and square with the top surface to .0003" in 14", which is .0001" on the 3½" part contacting the rail. The convex 28" x 84" face of the plate will spot the back of the rails concave, insuring a solid fit of the grinder head to the rails. The concave square edge of the plate will spot the bottom of the rail convex, to compensate for any slight deflection of the rail when the weight of the grinder head is added.

Use ACTION Card opposite page 64. Encircle No. 28

Vibratory parts feeder

A larger model Syntron vibratory parts feeder that will automatically handle heavier parts up to a 4" length on single or dual discharge tracks has been designed by the Syntron Co., 300 Lexington Ave., Homer City, Pa.



Equipped with a 24" or 30" diameter bowl, the model EB-23-B parts feeder provides systematized, oriented clockwise, counter-clockwise feed of odd shaped parts to all types of packaging and processing equipment.

Use ACTION Card opposite page 64. Encircle No. 29

WE REGRET THAT WE WILL NOT DISPLAY THE NEW* REGENT DUPLICATOR TABLE at the ASTE SHOW IN CHICAGO . . .

We are too busy filling your orders!

IF you have not investigated how the REGENT TABLE (mounted on your Bridgeport Mill in minutes) can enable you to do those complex profile milling jobs (2 or 3 dimensions) with inexperienced help, write for our latest literature.

*New Adjustable Brake for Selective Sensitivity.

*New Raceway Design for even smoother operation.

J. M. KALINS & COMPANY
115 East Washington Avenue
Bridgeport 8, Connecticut

Encircle No. 528 on Card, Opposite Page 65

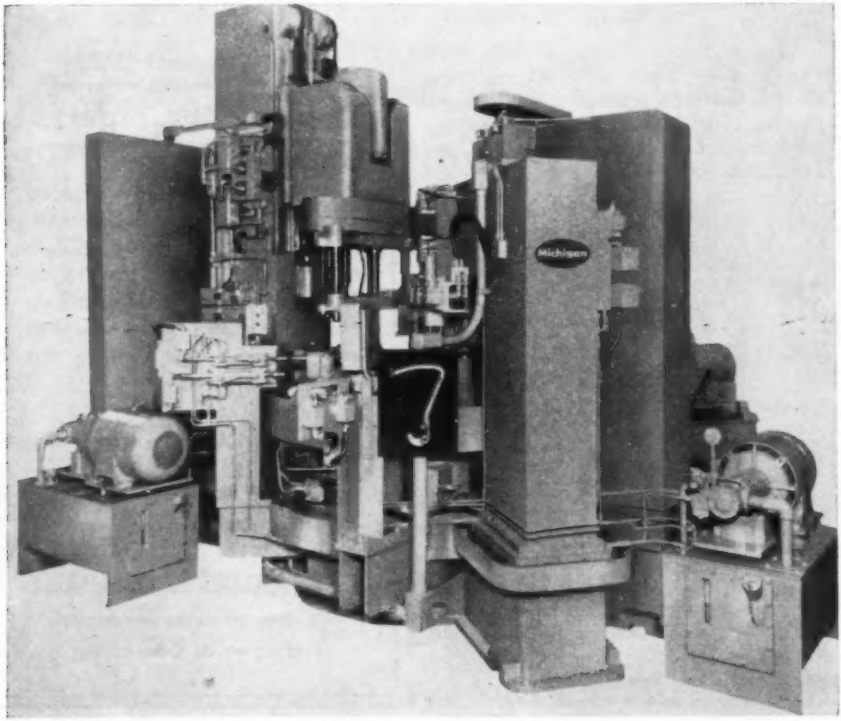
Horizontal and Vertical Dial-Type Machine That Does Its Own Testing

A horizontal and vertical dial-type machine, with a built-in hydraulic testing unit, designed and built for one of the leading automobile manufacturers, drills, spot faces, chamfers, finish reams, taps and tests 120 brake pedals per hour, according to the manufacturer.

Mounted on the base, which is welded steel, is a standard 42" automatic index table, with a 6-station work-holding fixture. All fixtures are power clamped. The standard Hydro No. 20 drill press column is used for the drilling and reaming operations, and standard master lead screw tappers for the tapping operations. It is built to JIC Electrical and Hydraulic standards.

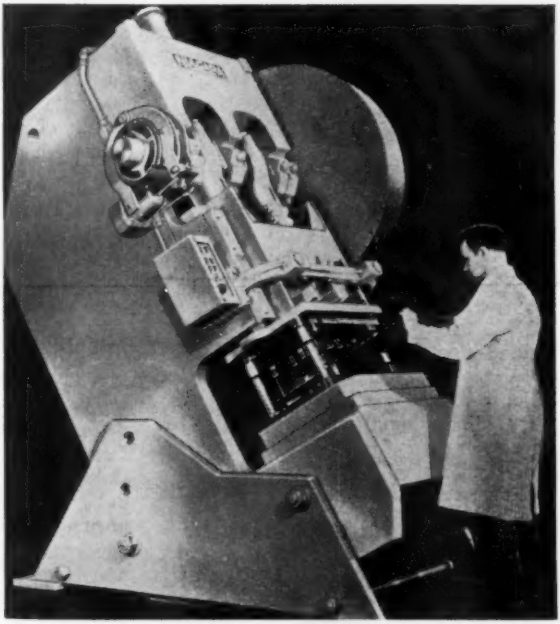
"One of the unique features of this machine is the hydraulic test provided for at the last station. Before the brake pedal is released at station 6, we subject it to a special hydraulic ram test, to detect any fractured pedals. In the event of a fracture, the machine will shut off, automatically. Thus, no rejects or fractured brake pedals can move on past this station to the assembly line," said Jerome Sullivan, president of the company. Michigan Drill Head Co., Dept. JS, P.O. Box 4643, Detroit 34, Mich.

Use ACTION Card opposite page 64. Encircle No. 30



Gap Frame Double Crank Presses For Long Die Area Work

Redesigned to keep pace with growing industrial demands, the modernized line of Niagara gap frame double crank presses features abundant die area, unusual accessibility and convenient work handling.



Built in two types, Upright, series B, and Open Back Inclinable, series BI, by Niagara Machine & Tool Works, Dept. RH, 683 Northland Ave., Buffalo, N.Y., the line is suitable for a variety of work involving long, progressive dies; multi-station dies, automatic feeds and drawing operations (when equipped with Niagara die cushions). Standard capacities are 45-200 tons.

A wide, all-welded steel, box type slide, fully contained within the gibbing, rigidly supports the punches. Overhanging flanges are eliminated. Two rugged connections directly resist any tendency of the slide to tilt under off-center loading, thereby minimizing misalignment of dies. Precision, "V" flat gibbing is brought down closer to the point of application than is possible on flanged slide single crank presses. The rigid, integrally built, all-welded steel, stress-relieved frame properly resists deflection, thereby maintaining permanent alignment of bearings and slide. An oversize, adjustable air counter-balance provides smooth press action.

Use ACTION Card opposite page 64. Encircle No. 31

New hand truck features pneumatic tires

Introduction of a new lightweight hand truck equipped with pneumatic tires has been announced by The Hamilton Caster & Mfg. Co., Dept. HS, 1700 Dixie Hwy., Hamilton, O.

According to the manufacturer, the Lite-N-Tuff hand truck as it is called, has been specially designed to reduce the effects of load jar on fragile cargo when moving over rough ground, jumping curbs, etc. The pneumatic tires serve to cushion the shock of impact, and also give added protection to floors and floor coverings. The new trucks are capacity rated to carry 400 pounds, and are available in single and double-handle models. Other features include:

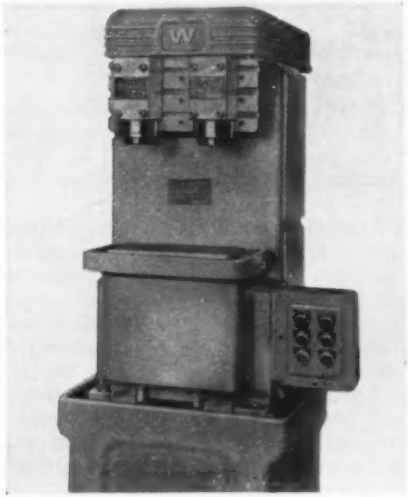


welded-steel tubular construction; concave steel cross-straps; stair climbers; roller bearing wheels; red enamel finish; rubber handle grips. Tire sizes offered are 8 x 3.00-4 and 10 x 3.50-4; 4 ply casings with inner tubes.

Use ACTION Card opposite page 64. Encircle No. 32

Automatic vertical boring machine

The Wadell automatic vertical boring machine, for precision boring, counterboring, facing and chamfering of small parts, maintains tolerances as close as 1/10,000th of an inch and surface finishes of 10 microinch rms when properly tooled.



Featuring an intermittent or continuous automatic cycle, the machine can be automated either as single or multiple units. It may also be used as a unit of a production line in conjunction with other automatic machines.

Maximum stroke is 4", maximum spindle speed, 8000 rpm. Wadell Equipment Co., 119 South Ave., Garwood, N.J.

Use ACTION Card opposite page 64. Encircle No. 33

Miniature press brake

A 12-inch brake with an added shearing feature and a low-price has been developed by the Rotex Punch Co., Dept. KE, 2350 Alvarado, San Leandro, Calif. Rotex's Minute Brake has been designed especially for model shops, experimental laboratories and production departments where space is an important factor without sacrifice in tool quality or versatility.

The new machine, despite its size, is capable of developing 4½-tons of pressure in such operations as hemming, internal notching, bending, flattening, corrugating, louvering, boxing and its special talent of shearing in 12-inch



long mild steel up to 14-gauge. Though favorably priced, it is capable on a miniature scale of any job done by a large press.

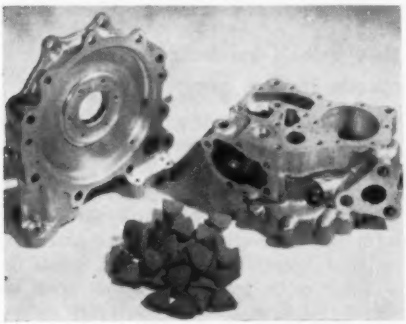
The manufacturer states that the Minute Brake, produced in an attractive newly developed finish, is made of the finest metals—ductile iron links, meehanite ram and frame. A standard handle is interchangeable for either left or right hand use, or a second handle may be adapted for two handed operation.

Instant change standard dies, shear blades, and stand are available. Other shapes and sizes may be ordered to fit special needs.

Use ACTION Card opposite page 64. Encircle No. 34

New barrel finishing media

Two new barrel finishing media have recently been placed on the market by Norton Co., Dept. DR, Worcester, Mass. The first, known as Tumblex T consists

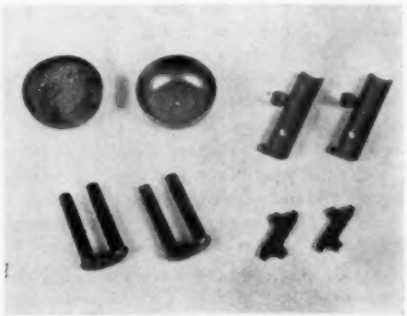


of Alundum vitrified bonded triangular shaped abrasive. This was developed to overcome the problem of the wedging of abrasive in parts being tumbled. The second new media, Tumblex N is a natural material. This is being used with good results in finishing, and especially die castings where conventional abrasives frequently cut through the outside protective layer of the casting exposing the porous structure beneath.

After considerable experimentation with a variety of different shapes, Norton determined that the triangular shape showed the least tendency to wedge. For finishing parts with holes, slots and recesses, many manufacturers have had to resort to hand finishing in the past because picking wedged abrasive from these openings took longer than hand finishing in the first place. The introduction of these new triangular molded shapes of abrasive means that many intricate parts can now be barrel finished with all the benefits of economy and better finish that this method makes possible.

Tumblex T is available in four sizes 4, 3, 2 and 1, (3/8", 5/8", 7/8", and 1-1/8" measured on the side of the triangle and ranging in width from 3/16" to 5/16"). Weight per cubic foot of the new moulded shape is 85 pounds.

Tumblex N is often used with small amounts of loose abrasive where additional cutting action is required. The

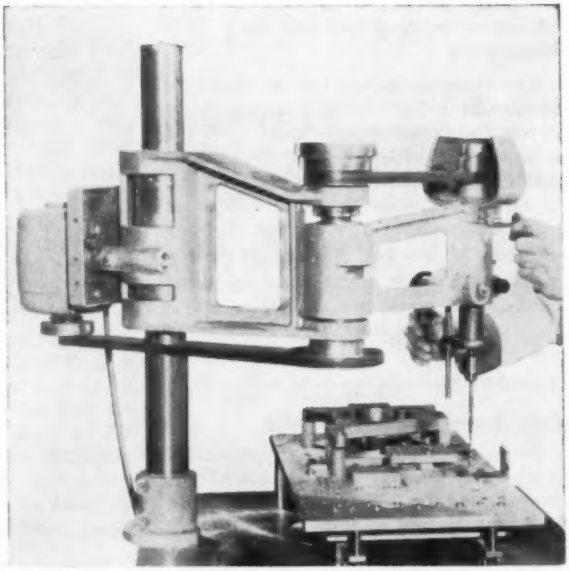


loose abrasive can be flushed out of the barrel and Tumblex N used alone for finishing. It is available in seven standard sizes ranging from 3/16" to 3/8" through 1-5/8" to 2-1/2".

Use ACTION Card opposite page 64. Encircle No. 35

When writing advertisers, please mention MACHINE and TOOL BLUE BOOK

Jointed Radial Drill Press Saves Money on Production Job



This little jointed-arm radial drilling machine, designed and manufactured by Hill Machine Co., Dept. RB, 1301 Eddy Ave., Rockford, Ill., reduced production time by 86% in comparison with a conventional set-up on standard drill presses. In addition, it made a substantial reduction in tool breakage, especially with very small taps.

The piece was a complex aluminum alloy aircraft part into which 119 holes, ranging in size from No. 50 to ¼", were to be drilled from the top, bottom, and one end. Of these holes, 105 were tapped, the threads ranging from No. 2-56 to ¼"-20. A large number of the holes were bottom-drilled and tapped, the balance were through holes.

Three jigs were used, the one for the top being shown in the picture. In an ordinary set-up the jig would have to be moved for each hole, a total of 224 moves. In this arrangement, the work was moved only 3 times.

In all, 37,800 holes were tapped without breaking a tap. Of this number, 12,240 were tapped No. 2-56, ½" deep.

The double belt drive and step pulleys provide a choice of 6 spindle speeds: 620, 1460, 2160, 5060, 8200, and 12,000 rpm from a 3600 rpm 1/3 hp motor.

The overall height of the machine is 30", diameter of spindle is 1¾", diameter of column 3", maximum distance from chuck nose to base is 18", travel of spindle 2½", and radial range from spindle center to column is 24".

Use ACTION Card opposite page 64. Encircle No. 36

New Brinell hardness tester speeds testing, prevents errors

Steel City Testing Machines, Inc., Dept. JS, 1817 Lyndon Ave., Detroit 38, Mich. have designed a new Brinell hardness tester with a paint spray attachment. The attachment synchronizes with the testing cycle of the machine so that relative hardness of parts is automatically indicated by a spot of paint. Sorting of pieces is in effect done by the machine rather than by the operator, resulting in less fatigue and fewer errors.

The tester is designed to fit right into a roller conveyor supplied by the customer. Castings from the foundry are rough ground top and bottom to remove most of the scale and then are rolled into place on the roller section of the Brinell tester. The operator locates the parts by means of a stop located at the rear of the rollers. He



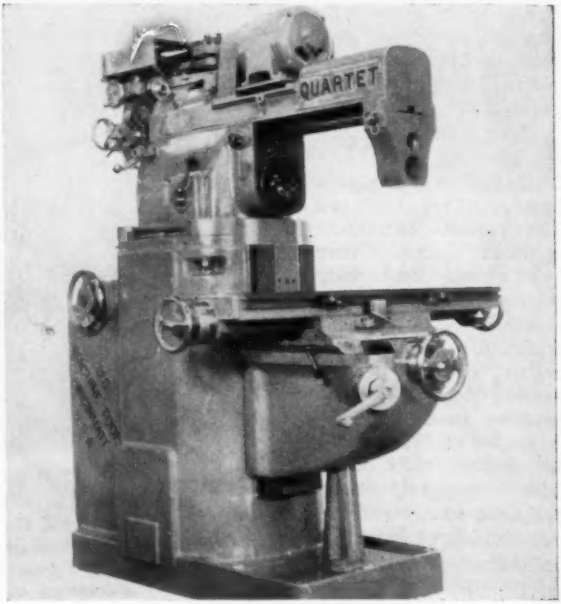
then manually depresses the cycle start button to the right of the load gauge, starting the hydraulic cycle of the machine. As the Brinell ball descends toward the casting, the roller section drops down, leaving the casting firmly seated on three hardened anvils, one of which is immediately below the penetrator. The Brinell impression is made and, if the part is acceptable from the standpoint of hardness, a spot of paint is automatically sprayed onto the casting. After a pre-determined interval, the load is released, the ball penetrator retracts and the rollers lift up so that the operator can roll the casting on down the conveyor to the next operation. At the end of the conveyor, castings are sorted. Those that are not sprayed are sent to the heat treating department while those that are OK are sent on for machining.

Use ACTION Card opposite page 64. Encircle No. 37

Horizontal Spindle Indexes for Universal Milling Operations

The horizontal spindle, rather than the saddle and table, indexes for universal operations on the "Quartet," a new milling machine built by U. S. Burke Machine Tool Div., Dept. HS, Brotherton Rd., Cincinnati, O.

The spindle is mounted in a massive turret, which may be swiveled 360° by means of a worm and worm wheel. When the Quartet is used as a universal horizontal miller, the spindle is indexed to the required angle, rather than swiveling the saddle, as is the conventional method. This feature provides extreme rigidity for precision



work. The table retains its inherent stability, and the turret locks securely at the desired angle.

In addition to universal and horizontal operations, it will perform vertical and angular milling operations, with speed and ease of changeover from one type milling to the other.

The Quartet is a full No. 2 milling machine, weighing 4500 pounds, with 30" of horizontal travel, 11" of cross travel, and 16¼" of vertical travel. The horizontal spindle has either a No. 40 or No. 50 taper and is driven by a 3 hp or 5 hp drive motor. The independently operated power-feed vertical head is driven by a 1½ hp motor, mounted on the rectangular overarm.

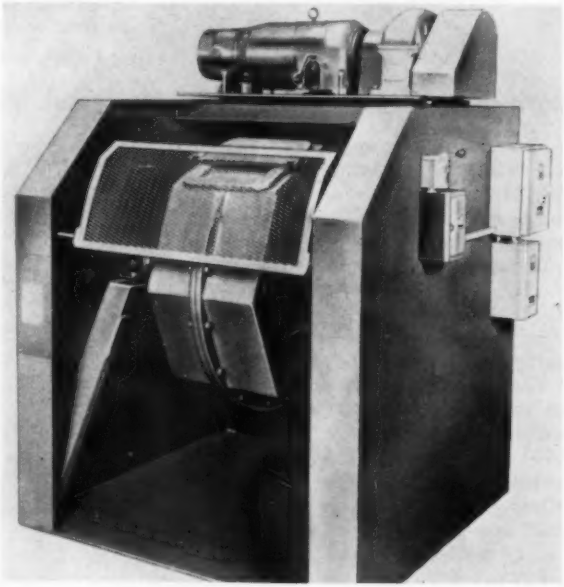
Among other features of this completely new machine are: the infinitely variable horizontal spindle speeds, from 29-1450 rpm; the fact that both the horizontal and vertical spindles may be used simultaneously; and the ability to operate the machine while the turret is being indexed.

Designed primarily for maintenance, tool and die shops, and model departments, the Quartet may also be used to good advantage on a number of production jobs. It is possible to mill, drill, bore, tap, face and counterbore a workpiece in one setting, without the use of fixtures, to extremely close tolerances.

Use ACTION Card opposite page 64. Encircle No. 38

Triple Action Cutting Barrel

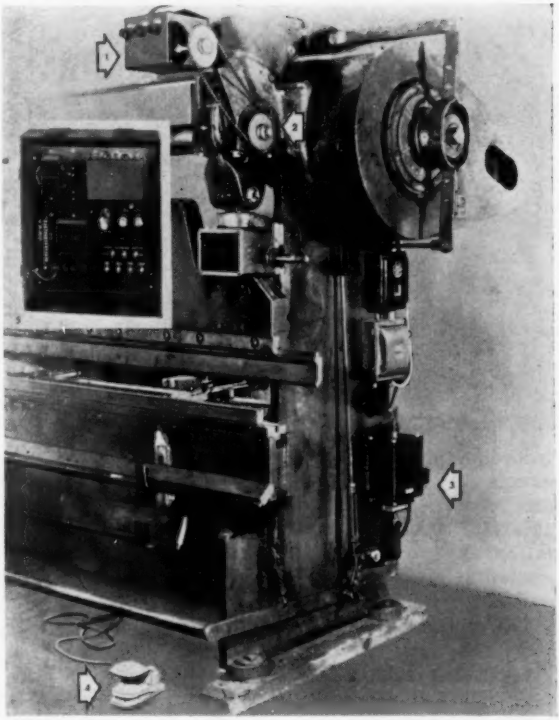
The Hartford Steel Ball Co., Dept. MG, 17 Jefferson Ave., West Hartford 6, Conn. has introduced into their line of triple action cutting barrels, two new fully enclosed models with 10 and 4 cu. ft. capacities.



The power unit is on top for long life, cleanliness and ease of maintenance. This feature also permits extremely compact design. Other labor and timesaving features include greater accessibility of controls which are grouped together; drum type reversing switch; 24 hour program timer that can be set for any cycle from 15 minutes to 24 hours with completely automatic control; magnetic starter and brake which permit inching of barrel into loading and unloading positions; tilt-back front safety guard; and improved 4 speed gear shift control, permitting standard RPM barrel speeds of 8 - 11 - 18 and 33 on 10 cu. ft. model and slightly higher proportionate speeds on 4 cu. ft. model. Other speed ranges can be supplied.

Use ACTION Card opposite page 64. Encircle No. 39

Improved Control for Press Brakes Removes Danger of Whipping



American Actuator Corp., Dept. MG, 219 E. 44th St., New York 17, N.Y., has built some new features into its AAC automatic press brake control that make this automation act even more human. Pulse of slip, now automatically slows the movement of the ram during the bending stage.

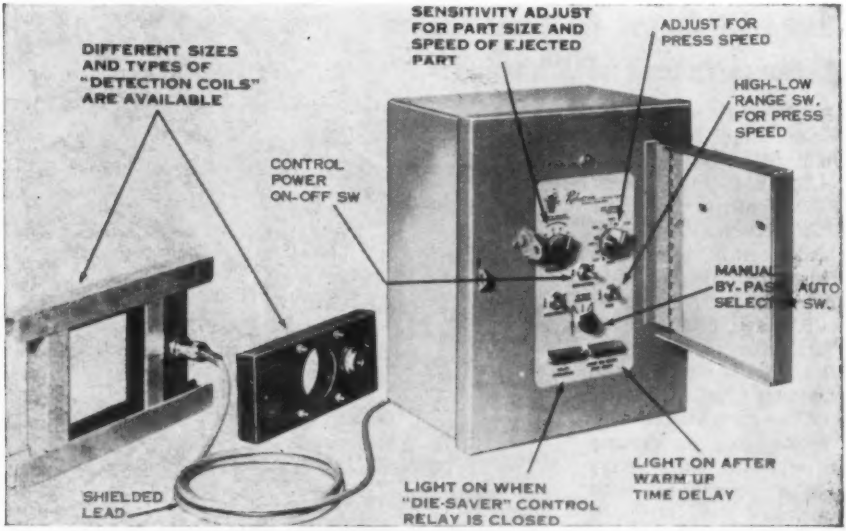
The control provides means for performing faster and safer press brake operations with unskilled as well as skilled operators. Its features include preset stop, which automatically stops the ram at any predetermined point in the down stroke; self return, which automatically returns the ram to the top of its stroke; and non-repeat, which prevents the press brake from repeating. Controls can be set for any one or any combination of these operations, as well as for one or more operators. Operation is by either foot or hand-switch, and when very rapid motion is desired, for double clutch, simply by flipping a switch on the control panel.

The AAC automatic control can be installed on any press brake regardless of size, age or manufacture. It consists of four components identified by number in the accompanying photograph: limit switch box tied in with the stroke of the ram (1, 2); solenoid (3); foot switch or hand button (4); and control panel (5).

Use ACTION Card opposite page 64. Encircle No. 40

Die-Saver Control Makes Press Operation Automatic

The new Die-Saver, Electronic Control, manufactured by Robotron Corp., Dept. JS, 21371 W. 8 Mile Rd., Detroit 17, Mich., attaches easily to stamping presses to reduce or eliminate possibility of damage to dies and presses due to double heading on non-ejected parts. In addition, it reduces possibility of accidents, allows faster automatic feeds, increases production, permits one operator to control more than one press, reduces operator fatigue, provides more

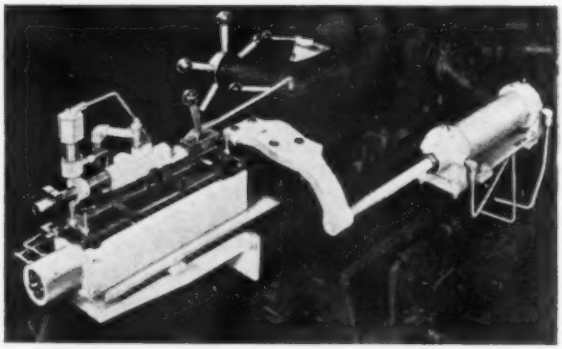


inspection and stock handling time, and counts only the parts stamped. The fail-safe control is enclosed in a 6½" x 10½"x12" shock-mounted cabinet which is easily portable for quick press mounting near any 115 volt, 60 cycle outlet.

The unit prevents recycling if ejected parts fail to pass the detection coil. It may be used for any stamping application where the press cycle can be made to stop at the top of its travel as it completes 360 degrees revolution or can be made to stop just before the punch enters the lower die.

Use ACTION Card opposite page 64. Encircle No. 41

Hydraulic Turret Drive

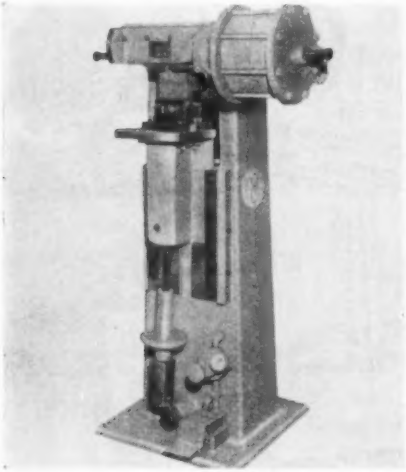


The Cash standard hydraulic turret drive may be quickly and easily adapted to any standard ram-type turret lathes No. 1, 2, 3, 4, and 5. It is said to increase production and reduce costs through the elimination of hand indexing and traversing. Designed to reduce fatigue and save time on short and long run work, it is also said to reduce the number of rejects, increase tool life, and assure improved finishes. A. W. Cash Co., Dept. RB, P.O. Box 551, Decatur, Ill.

Use ACTION Card opposite page 64. Encircle No. 42

Full-pneumatic marking machine

For light, medium or heavy-duty general purpose marking of round, flat or contoured parts, Jas. H. Matthews & Co., 3946 Forbes St., Pittsburgh 13, Pa. has introduced their new No. 237 full-pneumatic marking machine. This unit is designed for marking products such as lathe tools, gears, reamers, drills, cutlery, instruments and other parts with names, numbers, codings, trademarks, special lettering and designs.



The No. 237 features a pneumatic die-carriage and has a pneumatic table lift which produces up to four tons of marking pressure and provides an air cushion, which reduces stress on the parts being marked as well as the marking die. The unit employs either roller dies for marking flat parts, or flat-roll dies for marking round parts, and is also available with flat-roll holders or mortised roller dies and quick-change steel type.

Use ACTION Card opposite page 64. Encircle No. 43

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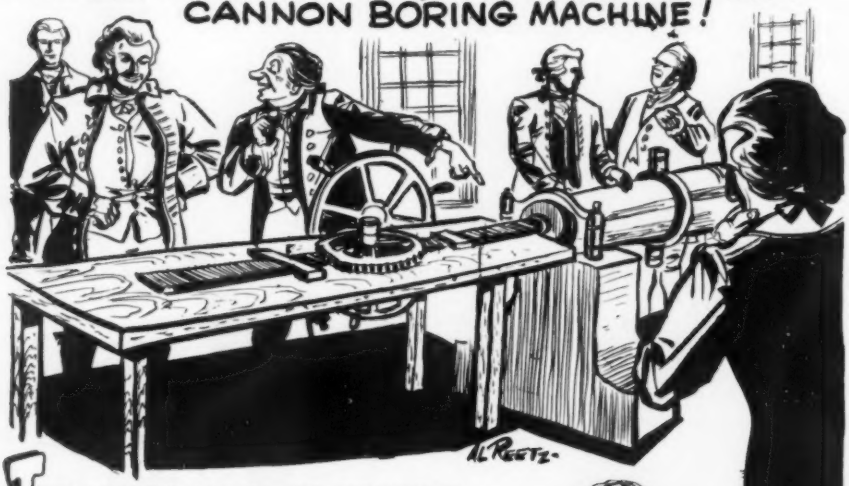
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400 Main Street, Manchester 8, Conn.

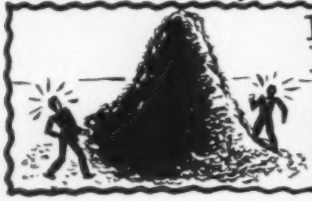
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Mechanics Through The Ages

CURIOUSLY ENOUGH, TWO UNRELATED 18th CENTURY WILKINSONS --JOHN OF ENGLAND AND DAVID OF AMERICA—SEEM TO HAVE DEVISED AND PRODUCED AT ABOUT THE SAME TIME (AND COMPLETELY INDEPENDENT OF EACH OTHER) THE WORLD'S FIRST **CANNON BORING MACHINE!**



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CAPACITIES

Spindle speed (in 24 steps)	145-2800 R.P.M.
Swing over Saddle	4"
Swing over Bed	13"
Capacity between Centers	36"
Maximum Standard Thread Length	2½"
Rated Capacity	8TPI - 40 TPI
Maximum number of Thread Starts	12
Maximum Taper Thread	25° Included

If your threading operations have reached the point of low return through loss of speed and accuracy, the Cri-Dan "B" can solve your problems.

The Cri-Dan "B" utilizes a single carbide-tipped point that generates threads with speed and accuracy unmatched by any other threading method. That's why we call it the "POINT of *High* Return".

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the LEES-BRADNER® Company

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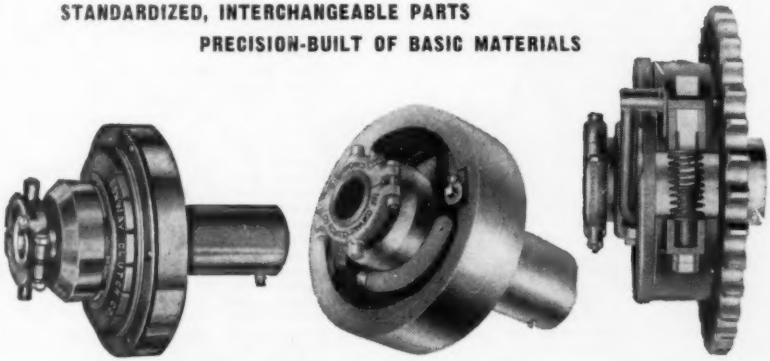
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6	1/4	1	21.60
6	5/16	1	22.10
6	3/8	1	23.70
6	7/16	1	25.30
6	9/16	1	31.20
6	11/16	1-1/4	33.45
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8	1/4	1	47.70
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8	7/16	1-1/4	66.80
8	9/16	1-1/4	70.55
8	11/16	1-1/2	75.65
8	13/16	1-1/2	79.35
8	7/8	1-1/2	83.25
8	1	1-1/2	87.35
10	1/4	1-1/2	87.80
10	5/16	1-1/2	89.10
10	3/8	1-1/2	90.15
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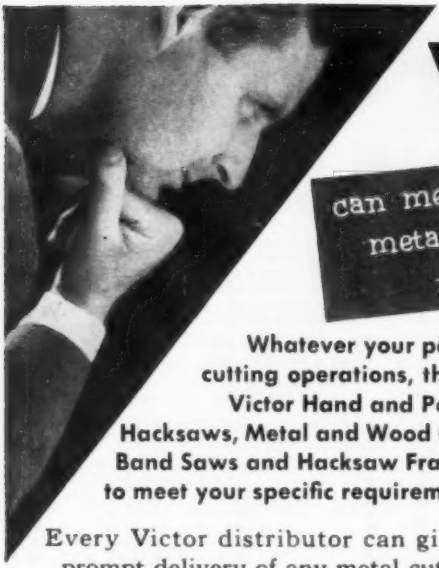
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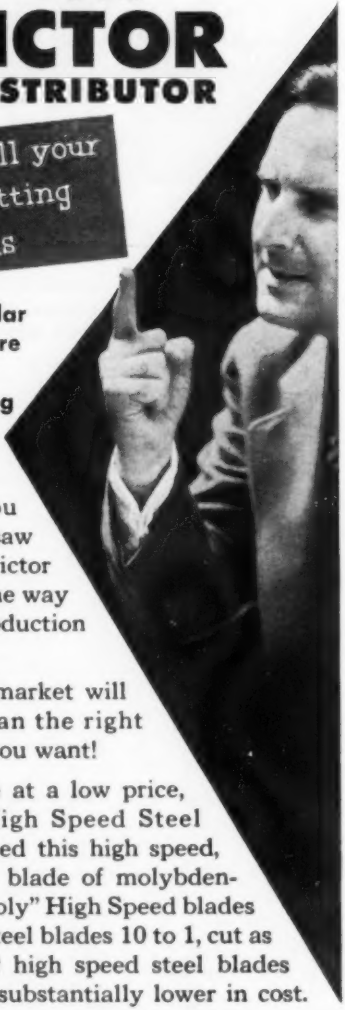
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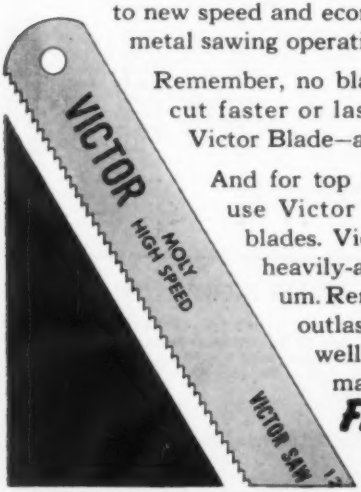
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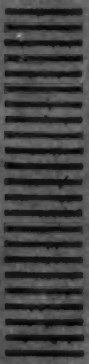
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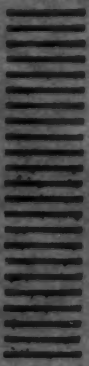
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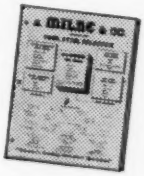
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